AI-Driven Digitalization as a Catalyst for Women Entrepreneurship

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DOI: https://doi.org/10.51584/IJRIAS.2025.100700032

Received: 10 July 2025; Accepted: 16 July 2025; Published: 02 August 2025

ABSTRACT

The paper investigates the effect of AI-based digitalization on the business performance of the female entrepreneur registered under the MSME in semi-urban Dharwad, Karnataka. It examines the information about the respondents (200 respondents), based on which it draws conclusions about the benefits of digital tools, like mobile payments, AI-driven marketing, and automation in terms of profitability, reach to customers, and efficiency. Correlation, regression analysis, t-tests, chi-square, and ANOVA are useful tools of statistical analysis which show that digital adoption has a significant positive impact on business. In addition, demographic factors such as education and experience determine the degree of utilization of digital tools. Overall, the performance of women who received digital training was very high as compared to women who had no training. The evidence sheds light on digitalization being a real driver, significantly empowering women entrepreneurs not only in the urban areas, but also in achieving inclusive economic growth. According to the study, special policies, the enhancement of digital training, and infrastructure development should be taken to facilitate broader integration of AI. Such understanding is of practical use to policy makers, support agencies and entrepreneurs who want to succeed in the onset of business environment that is going digital.

Keywords: Digitalization, Women Entrepreneurship, AI tools, MSMEs, Business Performance

INTRODUCTION

Digital technologies and artificial intelligence (AI) are one of the powerful forces that transform the business environment globally during the times of rapidity in terms of technological investment. Women entrepreneurs are some of the main beneficiaries of the digital revolution, as they are finding ways to use AI-driven technology to shatter all forms of conventional barriers, and enter the mainstream of the economy. Such innovations as digital payment systems and AI-enabled customer insights have allowed women to open, run and grow businesses more efficiently and with a larger geographical output than ever before.

Digitalization cannot be seen as a helper, but as an enabler, because it allows women to reach markets, learn, operate, and innovate on real-time basis. The synergistic combination of AI and digital tools with entrepreneurship has especially contributed to the development of new roads to inclusive economic growth, especially in the developing nations such as India. Female entrepreneurs who usually are limited by the lack of mobility and minimal capital and access to social networks now have digital platforms that close these gaps.

The paper hereby explores the impacts of AI-driven digitalization as far as women entrepreneurship is concerned, using a sample size of 200 registered women entrepreneurs in the MSME sector. The data obtained is about Dharwad, India, nonetheless, the lessons are relevant to more universal discussions regarding the life-changing power of AI in the global trade and empowerment of women economically.

REVIEW OF LITERATURE

Past studies also establish a uniform trend according to which digitalisation and AI-based tools are significant factors in the promotion and transformation of women entrepreneurship across the world. According to Welter

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VII July 2025

and Smallbone (2008), digital platform access was critical to the development of women-led entrepreneurs in the Eastern European business sector, particularly those ones that had less startup capital. In the same light, a study conducted by Kishor (2011) on emerging gender opportunities among women-empowered entrepreneurs in the tier-two cities of India brought about the importance of online markets and mobile networks that presented new opportunities to the women business owners. Research in the developed settings, like the research of Hunt (2012) in Canada and Khurana and Sharma (2014) in India, showed how mobile and AI-enabling technologies assisted female entrepreneurs to save their time and conduct a business at home. The point put forward by Basu and Saha (2015) is that digital literacy had a direct impact on the success of entrepreneurs, which formed the premise of the adoption of AI. In Latin America, Hechavarria and Ingram (2015) mentioned that micro-financing apps aided by different applications of AI positively changed the opportunity to access credits in rural women and Bacq and Janssen (2016) emphasized that AI lessened the requirement of a physical foundation, rendering entrepreneurship more extensive in building economies.

Even such national-scale programs as Digital India and Startup India contributed to enhancing digital awareness and access of women significantly (Rani & Murthy, 2017). Nambisan et al. (2017) also mentioned that AI-based algorithms in a platform-based enterprise such as Uber and Etsy assist with the goods location and customer assessment, which more women entrepreneurs exploit. Patel (2018) has emphasized the role of AI-driven social media analytics in transforming the results of women micro-entrepreneurs in India. George et al. (2019) discovered at global level, that women-led startups gained much in terms of performance when tools of AI like chatbots and predictive analytics were implemented. Such region-specific research as Deshmukh (2020) in Maharashtra and Wu and Li (2020) in China presented the evidence that automation powered by AI and customer behavior analytics in the sphere boosted productivity, conversion rates, and brand positioning.

More recent studies reinforce these tendencies even further: Raj and Menon (2022) established positive connections between the use of AI tools and business sustainability in all women-led MSMEs in South India, whereas Moghadam and Amini (2022) described how AI assisted Iranian women entrepreneurs in enhancing their market penetration and customer loyalty. Lastly, Sharma and Iyer (2023) implied in their conclusion that customer segmentation that uses AI capacity was able to enable optimal efficiency, customer retention, and sales in an area of significant accomplishment among women entrepreneurs. All of this research critically points to the fact that AI and digitalization are now becoming the appurtenance of women entrepreneurship strategies although the difference still lies in non-urban or sem-urban or regional settings such as Dharwad.

Research Gap

According to the majority of the research, digitalization is helpful to women entrepreneurs (Basu & Saha, 2015; Rani & Murthy, 2017), but it is not that often that the authors draw attention to the determining influence of AI-based tools on performance. The focus of the research is also on metro cities, disregarding semi-urban space such as Dharwad (Raj & Menon, 2022; Sharma & Iyer, 2023). Little evidence is also available on the role of demographic and experience factors, such as education, in the use of AI among MSME-registered women entrepreneurs (Deshmukh, 2020; Moghadam & Amini, 2022). This paper will fill these gaps by looking at how digitalization facilitated by AI becomes an enabling agent to women entrepreneurs in Dharwad.

Statement 0f the Problem

Despite the fact that digitalization is well-known to conduct women business development (Basu & Saha, 2015; Rani & Murthy, 2017), studies have scarce analyzed the effect of digital tools, driven by AI, on business performance, either separately or in terms of the presence of automated marketing, digital payments, and analytics. Metro regions are also the subject of most of the literature available (Raj & Menon, 2022; Sharma & Iyer, 2023) with encroached on semi-urban areas such as Dharwad.

Moreover, it remains little known how such demographic variables as education and experience may impact the adoption of AI by the women entrepreneurs registered in MSMEs (Deshmukh, 2020; Moghadam & Amini, 2022). This research will fill these knowledge gaps since it will determine how digitization in the Dharwad region helps drive business through AI and which population groups can enjoy the most.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VII July 2025

OBJECTIVES OF THE STUDY

To assess how digital and AI tools affect the business performance of women entrepreneurs.

To examine how demographic factors relate to digital tool adoption among women entrepreneurs.

Hypotheses

H_{01}: Digital and AI tools have no significant effect on business performance.

H_{11}: Digital and AI tools have a significant effect on business performance.

H_{02}: There is no significant relationship between demographic factors (such as age, education, experience, income) and digital tool adoption.

H_{12}: There is a significant relationship between demographic factors and digital tool adoption.

RESEARCH METHODOLOGY

Research Design

This research considers a quantitative research design that is both descriptive and analytical in exploring the impacts of AI enabled digitalization on the performance of businesses in the MSME-registered women in Dharwad. The design aids in measuring and explaining the correlation between the implementation of the digital tools and the corresponding business in a systematic way and also investigates the impacts that demographic factors like age, education, income, and experience have on the engagement of digital tools. The study presents an evidence-based body of work that combines descriptive observations with statistical analysis to reach findings that can be useful to researchers and policymakers and practitioners.

Population and Sample

The study dwells upon MSME-registered women entrepreneurs in semi-urban and small urban settings of Dharwad, Karnataka. The method of purposive sampling was used to obtain 200 respondents with few experiences in the application of digital or artificial intelligence tools in business activity. The reason is that it was necessary to conduct this sampling to consider only those entrepreneurs who had digitalization relative to them directly, as its analysis would be limited but meaningful.

Data Collection

The structured questionnaire based on Likert-scale questions and closed-ended questions was used to collect primary data assessing the extent of digital and AI tool usage and bearing demographic data and signs of business performance including sales growth, profitability, and efficiency. To supplement the primary data, secondary data were retrieved using official government MSME reports, academic articles and databases which were used to develop some context and confirm the findings.

Tools and Techniques for Data Analysis

In order to meet the objectives of the study and examine the hypotheses, a number of statistical methods have been utilised. The effects of digitalization on business performance were considered based on correlation analysis, regression analysis and independent samples t-tests. In the meantime, the chi-square tests and ANOVA were used to investigate the interconnection of the demographic factors and the degree of usage of digital tools. Analysis and processing of data was on SPSS and excel, which is accurate in computation and interpretation of statistics. This combination of descriptive and inferential statistics enhanced the conclusions made in the study and made the findings reliable and feasible.

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Limitations of the study

The research sample is limited to women entrepreneurs registered as such entities through MSME which might not be a reflection of the businesses coming in under informal sector.

Such data may be biased by the respondents due to self-reporting.

RESULT DISCUSSION AND SUGGESTIONS

Demographic Profile of Respondents (N = 200)

Variable	Category	Frequency (N)	Percentage (%)
Age Group	Below 30	40	20.0%
	31–40	75	37.5%
	41–50	55	27.5%
	Above 50	30	15.0%
Education Level	Secondary	50	25.0%
	Graduate	90	45.0%
	Postgraduate & Above	60	30.0%
Business Experience	Less than 2 years	40	20.0%
	2–5 years	90	45.0%
	6–10 years	50	25.0%
	Above 10 years	20	10.0%
Monthly Income	Below ₹10,000	30	15.0%
	₹10,000–₹25,000	70	35.0%
	₹25,001–₹50,000	60	30.0%
	Above ₹50,000	40	20.0%
Business Sector	Manufacturing	60	30.0%
	Services	90	45.0%
	Trade/Retail	50	25.0%
Marital Status	Married	140	70.0%
	Unmarried	40	20.0%
	Widowed/Separated	20	10.0%

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According to the demographic profile of the respondents, those between the ages of 31 to 50 years dominated the sample with more than 65 per cent of the respondents. This implies active entrepreneurial activity at mid-career stages. Educationally, most of them were well-educated: 45 percent were graduates and 30 percent postgraduate students, and this means that they have excellent academic backgrounds to embrace digital adoption.

The business experience, as measured in years of operations, was favorable with 45% of them having 2-5 years of experience, 25% having 6-10 years of experience and the rest (20%) having an experience of 11 years or more. Information on monthly income indicates that 35 percent of population generated 10,000 to 25,000 Indian rupees, 30 percent earned between 25,001 and 50,000, validating that majority of businesses are micro or small sized enterprises.

Nearly half, 45 percent, were in services followed by 30 percent in manufacturing and 25 percent in trade or retail. Lastly, the statistics reveal that 70 percent of the respondents were married, which perhaps brings out the importance of family support in the sustenance of entrepreneurship.

Correlation Analysis

Variable Pair	Pearson's r	p-value	Interpretation
Digital Tool Usage & Business Performance	0.62	0.000	Strong, positive, and statistically significant

The utilization of digital and AI tools is positively correlated to business performance ($r = 0.62$, $p < 0.01$). This implies that the more the women applying the entrepreneur tend to embrace the use of digital tools, the more they are likely to record significant changes in their sales, the number of customer reach, and the efficiency of operations.

Regression Analysis

Predictor	β (Slope)	R^2	p-value	Interpretation
Digital Usage Score	0.48	0.39	0.000	Significant positive predictor; explains 39% of variation in performance

Correct implementation of digital tools is an important indicator of business performance. The degree to which women entrepreneurs take advantage of the digital and AI tools explains about 39 percent of variability in business success.

Independent Samples T-Test

Group	Mean Business Performance (%)	N	t-value	p-value	Interpretation
Digital Training (Yes)	21.8	124	9.18	0.000	Significant difference
No Training	13.2	76			

It reveals that the average business performance in women entrepreneur was higher among persons who had undergone digital training (21.8 percent) than among those who had not received digital training (13.2 percent).

The result is statistically significant ($t = 9.18$, $p < 0.001$) that confirms the conclusion on the substantive role of training as contributing to the effectiveness of digital adoption.

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The finding adds to the validity of the first hypothesis, saying that digital and AI practices (including training) impact business outcomes in a positive manner and to a great extent.

Chi-Square Test

Education Level	High Digital Usage	Low Digital Usage	Total
Secondary	30	20	50
Graduate	70	20	90
Postgraduate & Above	50	10	60

Chi-square value (χ^2): 18.76 **p-value:** 0.001

The significant association between education level and adoption of digital tools was exhibited in the test (X2 = 18.76, p = 0.001). Highly educated women have higher chances of taking active initiatives on applying digital and AI technologies in their companies. This evidences the hypothesis (H 1 2) that the demographic variables (such as education) play an important role in the digital adoption process.

ANOVA Test

Experience Group	Mean Digital Usage Score	N
Less than 2 years	6.8	40
2–5 years	7.6	90
6–10 years	7.9	50
Above 10 years	8.1	20

F-value: 5.82 **p-value:** 0.003

The ANOVA correlation demonstrates that there are significant variations in the rate of digital tool implementation based on the experience groups (F = 5.82, p = 0.003).

With experience, women entrepreneurs show higher scores relating to digital usage, which implies that the experience stimulates more incorporation of the digital tools.

This also speaks in favor of H 1 2: demographic factors (in this case experience) influence the degree of digital adoption.

RESULTS

The analysis was done within the responses of 200 women entrepreneurs with registered MSME and actively applying digital tools in their business activities. The descriptive statistics showed that the entrepreneurial base in the sector was relatively young with the vast majority of the women aged between 31 and 50 years, and many of them being the graduates or postgraduates (75%). The overall usage of digital was high reporting 90 percent in digital payments, 86 percent in mobile banking, 70 percent in social media marketing, and 40 percent in e-commerce platforms.

The mean digital usage score across all respondents was 7.4 out of 10, with the mean of reported improvement to the business operations (in terms of profitability, customer outreach and operational efficiency) after an entity has gone digital amounting to 18.5%.

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The correlation indicates that there is positive but strong and statistically significant relationship (r = 0.62, p = 0.000) between digital tool usage and business performance.

The use of regression analysis verified that there is significant correlation between digital adoption and business performance (0.48) whereby 39 percent of the relationship between digital adoption and business performance is attributed (R2 = 0.39, p = 0.000).

The mean level of performance in business by women entrepreneurs who were subjected to digital training was determined through the t-test to be higher (21.8%) relative to the performance of the women entrepreneurs who have not been trained (13.2%) and the difference is also found to be significant (t = 9.18, p = 0.000).

In the test of the second hypothesis, a chi-square indicated significant relation between education level and digital adoption (x 2= 18.76, p = 0.001). An ANOVA test showed that there are significant variations in digital adoption according to business experience (F = 5.82, p = 0.003), which have demonstrated that more experienced entrepreneurs use digital more.

DISCUSSION

The results of the research are clear and state that AI-driven digitalization is an impetus to the successful performance of women in business and makes their business more sustainable. A close relation between the advancement in the profitability, market coverage and efficiency of operations with the incorporation of digital technologies such as mobile payments, AI-based marketing and e-commerce is indicated by the high degree of positive correlation between the variables and significant regression output.

The result of t-test, in turn, emphasizes the significance of digital training, which leads to capacity building greatly contributing to business outcomes. This indicates that provision of specific training programs can serve as a direct factor in empowering women entrepreneurs to use digital tools to various extents.

There is a lot of evidence that suggests that the factors influencing digital adoption are demographic in nature especially higher education and increased years of experience in business; this is corroborated by the chi-square test and ANOVA based calculations. The more experienced women are, and the higher the level of education, the more they are able to take up, absorb and help in utilizing new digital and AI systems and tools.

SUGGESTIONS

Firstly, there is an urgent necessity to provide digital training and capacity building of women entrepreneurs. It is important to focus on localized, practical training programs that would discuss AI tools, digital payments, social media marketing and e-commerce. Such training programs must be provided by the women associations, centers providing the development of MSMEs, as well as by the NGOs, especially in the semi-urban areas where less than formal digital literacy is not very high. These programs might assist in filling the gaps in skills and enabling women to make the maximum use of digital tools to enhance business development.

Secondly, one should aim at enhancing digital connectivity and affordability in semi-rural and smaller urban areas. The wide implementation of broadband internet connectivity and the enhanced mobile networks are sure ways of enhancing the accessibility of the digital tools. Moreover, I would provide subsidized smartphones, POS devices, and AI tools that are designed to be user-friendly by women entrepreneurs with low-income background to avoid the cost barrier, and promote the digital penetration.

It is also imperative to have more awareness about government schemes. Whereas there are some national programs such as Digital India, MSME Udyam and startup India, none of them are well known or seem to make them easily understandable by many female entrepreneurs. These schemes can be made more visible by targeted awareness campaigns that can be distributed on the local media as well as through community gatherings and electronic channels. The participation can be increased by simplification of the application and enrollment process.

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Institution of peer learning as well as mentorship activities can also go a long way. Newer entrepreneurs can learn based on the real experience of women entrepreneurs by sharing their stories of success, strategies and challenges of using the digital tool in the platforms. Also, organized mentorship processes where businesswomen with advanced experience can mingle with those who have recently entered the market can teach the latter how to navigate digital environments and AI technologies.

Lastly, the policymakers ought to pay attention to inclusive digital policies that specifically aim to address the barriers experienced by female entrepreneurs. Some of the gender-responsive approaches may consist of incentives to implement digital tools, the collaboration with technology companies to provide free or affordable courses in AI, and digital literacy campaigns localized within the community. Such efforts can be performed by coordinating policy, training, and infrastructure support so that digitalization becomes a real driver of sustainable development among female-led MSMEs.

CONCLUSION

The research is clear enough that digitalization through AI is not a backup instrument but an innovative driver of change and sustainability of women-owned MSMEs. The study, which used empirical data collected from 200 women entrepreneurs registered under MSME in business, showed that the balance between the use of digital and AI tools and the increase in the indicators of business success profitability, customer reachability, and the efficiency of operations was also significantly and positively correlated.

The results also emphasize the very important role of digital training, which is highly effective in increasing business performance in women entrepreneurs, and also the demographic differences in talent such as education and experience that play a key role in determining the rate of adoption of digital training. Entrepreneurs with more education and experience were in a better position to use AI technologies as a way of becoming more competitive.

Collectively, these observations confirm that policy measures focused on capacity-building efforts, strengthened digital infrastructure, inclusive policy and a more comprehensive understanding of what governments have to offer can help advance the empowerment of women entrepreneurs to incorporate AI and digital tools successfully. At the end of the day, the integration will not only serve to close the current gender gap in entrepreneurship but also serve to help the emerging markets have sustainable inclusive economic growth. The study thereby presents AI-led digitalization as a major advocator of women economic empowerment, and hence has valuable policy implication to policymakers, support organizations and women entrepreneurs who strive to be successful in a more digitalized business world.

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