

Women entrepreneurs in the digital age : Bridging challenges and sustainability goals

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Abstract

The technology can potentially expand the market reach and operational efficiency of SMEs, especially women entrepreneurs, who have adopted many SMEs to gain their identity everywhere and enhance their contributions to the economy. The study examines how digitalization affects women entrepreneurship and sustainable development of Indian women entrepreneurs and investigates how digital technologies affect women efforts to be sustainable and their skills for entrepreneurship using SEM. Study results, digitalization has a moderate effect on entrepreneurial capacities while having a favourable impact on

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sustainability development, the insights offered are helpful to policymakers who want to encourage women entrepreneurship through focused digitalization initiatives.

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1. Introduction

The Brundtland Report [1] established and defined what is meant by sustainable development and laid the groundwork of sustainability's three pillars environmental, social, and economic. The recognition that economic growth often produces environmental problems has led to strong global focus on promoting environmentally friendly production and consumption practices [2]. The aim of this global effort is for people to advance economic progress and human well-being while working towards the same sustainability goals of the people we have been talking about [3]. Many women continue to be under-represented as leaders and senior managers worldwide. However, the role of women entrepreneurship draws the attention of previous studies for sustainable development [4]. Improvement in women entrepreneurial capacities increases women's empowerment and reduces gender inequality in any entrepreneurship policy [5].

This study looks at the features that women entrepreneurs need to have to achieve sustainable development. Examines the variables influencing women entrepreneurs' sustainability development. The goal of the research is to aid in the analysis of women entrepreneurship from a gender viewpoint to advocate policies. Women's entrepreneurship can be supported and encouraged in the context of sustainable development by digitalization that contributes to economic growth and appropriate consumption. The study fills the gap by analyzing the extent to which women's sustainability development is impacted by their capabilities and by looking into the elements of effective digitalization.

2. Related Studies

Research shows that women in agriculture, especially in the European Union, are embracing agri-environment-climate schemes (AECS) at a growing rate [6]. Digitalization does not affect women entrepreneurs' decisions to use technology in their day-to-day business operations [7].

Study investigate the possibilities of beginning a new venture; embracing risks, presenting advancements, organizing organization and controlling business and giving powerful leadership in all parts of business [8]. Women entrepreneurship capabilities detecting business opportunities, acting in uncertain environments and solving problems [9]. The theoretical framework is related to family studies, including the perspective on work-family balance [10]. Family support can help women entrepreneurs become more capable of being entrepreneurs. Economic issues drive women entrepreneurs, who frequently take up business as a means of seizing chances [11].

3. Study Objectives

1. To study the relationship between women entrepreneurship capabilities and sustainability development.
2. To know the effect of digitalization on women entrepreneurship capabilities.
3. To know the effect of digitalization on sustainability development.

4. Study Hypotheses

H1: Challenges have a positive effect on women entrepreneurship capabilities.

H2: Family support has a positive effect on women entrepreneurship capabilities.

H3: Motivation has a significant positive effect on women entrepreneurship capabilities.

H4: Challenges have a negative effect on sustainability development.

H5: Family involvement positively contributes to the advancement of sustainable development initiatives.

H6: Motivation has a positive effect on sustainability development.

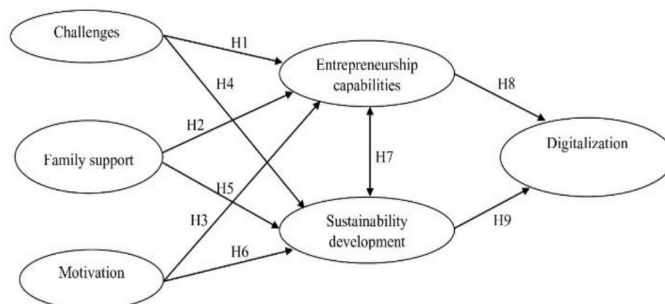
H7: There is no significant relation between women entrepreneurship capabilities and sustainability development.

H8: Digitalization harms women entrepreneurship capabilities.

H9: Digitalization positively influences the progress of sustainable development.

5. Materials and Methods

The study used Structural Equation Model to study the relationship between women entrepreneurial capabilities and sustainable development through the lens of digitalization. A convenient sample of 175 women entrepreneurs from southern India participated in the survey. Key variables include sustainable growth, challenges, family support, motivation, and digital readiness. The aim is to identify effective online platforms that support women-led businesses. Data was gathered using a literature-based online questionnaire, focusing on women involved in boutiques, green grocery stores, emporiums, online ventures, and beauty parlours. The survey addressed key factors like motivation, obstacles, family backing, sustainability, and digitalization. Every item on the questionnaire uses a 5-point Likert scale to gauge the opinions of women entrepreneurs. The study looks at five categories (See Figure 1).



Source: Author development

Figure 1
Represents SEM of Digitalization, entrepreneurship capabilities and digitalization

6. Results Analysis

6.1 Demographic Profile

Table 1
Frequency table for demographic parameters

cen	Frequency
Marital Status	175(%)
Married	127 (72.57%)

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Single	48 (27.43 %)
Other	0
Age	
21 - 30 years	39 (22.28%)
Individuals age 31 - 40 years	112 (64%)
Individuals age 41 - 50 years	21 (12%)
Individuals age 51 - 60 years	3 (1.72%)
Individuals age 60 + years	0
Education	
Below high school	11 (6.28%)
High school	16 (9.14%)
Bachelor's degree	94 (53.71%)
Masters' degree	48 (27.43%)
PhD degree	6 (3.45%)
Entrepreneurship experience	
No experience	86 (49.14%)
Below 5 years	70 (40%)
5-10 years	17 (9.74%)
11-15 years	1 (0.58%)
16-20 years	0
21+ years	1 (0.57%)
Company type	
Emporium	25 (14.28%)
Beauty parlour	38 (21.73%)
Boutique	27 (15.42%)
Online business	58 (33.15%)
Green grocer	27 (15.42%)
Company size	
Under 10 employees	174 (99.42%)
11-50 employees	1 (0.57%)
51-100 employees	0
101-150 employees	0
150 above	0
Invested capital	
Below 10 lakhs	113 (64.57%)
11 lakhs – 30 lakhs	61 (34.85%)
31 lakhs – 50 lakhs	1(0.58%)
51 lakhs – 70 lakhs	0
71 lakhs – 1 crore	0

Table 1 states that the demographic profile indicates that most respondents are married (72.57%), with the highest age group being 31 - 40 years (64%), followed by 21 - 30 years (22.28%). Educationally, the majority hold a bachelor's degree (53.71%), while 27.43% have a master's. nearly half (49.14%) have no entrepreneurial experience, and 40% have less than five years. Online businesses (33.15%) are the most common ventures, followed by beauty parlours (21.73%), boutiques, and green groceries (15.42% each). Regarding capital, 64.57% have investments below ₹10 lakhs, while 34.85% fall in the ₹11-30 lakh range. Only a small fraction (0.58%) reported capital between ₹31-5 lakhs. The measurements that were employed in conjunction with the construct measurement model and mean and standard deviation are displayed in Table 2 below.

6.2 Measurement Model

Table 2
Mean, Standard Deviation Measures

		FMean	CHM	MTM	ECM	SDM	DLM
N	Valid	175	175	175	175	175	175
	Missing	0	0	0	0	0	0
Mean (m)		4.4419	4.4731	4.5038	4.4743	4.3829	4.4183
Std. Deviation		.52061	.50800	.50602	.49500	.44197	.52359

Mean scores were between 4.3829 (SDM) and 4.5038 (MTM), reflecting positive perceptions. SD ranges from 0.44197 to 0.52359, indicating low variability. The reliability test results for the structures are shown in Table 2 below.

Table 3
Represents the results of Reliability test

Constructs	No. of items	Alpha (α)	AVE
Challenges of women entrepreneurs	5	.876	0.80
Family support of women entrepreneurs	3	.759	0.85
Motivation	6	.897	0.85
Entrepreneurship Capabilities	6	.889	0.84
Sustainability Development	5	.781	0.80
Digitalization	5	.887	0.60

(AVE = Average Variance Extracted)

Since Cronbach's Alpha is a frequently used indicator of reliability related to scores obtained from a scale, the study used the SPSS tool for its analysis. Table 3, presents the reliability test. Higher values indicate better reliability and motivation of women entrepreneurs has the highest reliability (.897), while women entrepreneurs are getting low support from their family members (.759), which suggests that these constructs are very stable and reliable.

Table 4
Overall Model Fit

Chi – square	1214.94
d.f.	174
p – value	0.000
RMSEA	0.07
CFI	0.52
GFI	0.47

*Note - CFI refers to the Comparative Fit Index, GFI stands for the Goodness of Fit Index, and RMSEA denotes the Root Mean Square Error of Approximation.

A confirmatory factor analysis (CFA) evaluates the measurement's good-of-fit. Consequently, the data collection (= 1214.94, df = 174, p = 0.000, RMSEA = 0.07, CFI = 0.52, and GFI = 0.47) fits well with CFA. Table 4 displays the model's overall fit indices. 174 degrees of freedom with samples, the chi-square test values were 1214.94, p = .000. Model fit can be evaluated using chi-squared values, the CFI of 0.52, the GFI of 0.47, and the (RSMEA) of 0.07. Fit indices values that are consistent with a well-fitting model to the dataset.

6.3 Structural Model

Table 5 presents SEM path coefficient results, confirming six supported hypotheses. Challenges, family support, and motivation significantly influence entrepreneurial capabilities (H1: $\beta=0.43$, H2: $\beta=0.37$, H3: $\beta=0.11$). Family support ($\beta=1.33$) and motivation ($\beta=0.794$) positively impact sustainability development, while sustainability development strongly drives digitalization ($\beta=1.18$). Challenges negatively affect sustainability, and no significant link exists between entrepreneurial capabilities and sustainability. Moreover, digitalization negatively influences entrepreneurial capabilities but significantly enhances

Table 5
Results of Path Analysis

Path	Path estimate	t-value	Significant
H1: Challenges → Entrepreneurship capabilities	0.43	20.21	s
H2: Family support → Entrepreneurship capabilities	0.37	17.95	s
H3: Motivation → Entrepreneurship capabilities	0.11	5.31	s
H4: Challenges → Sustainability development	-0.36	-12.70	ns
H5: Family support → Sustainability development	1.33	50.84	s
H6: Motivation → Sustainability development	0.794	28.29	s
H7: Entrepreneurship capabilities → Sustainability development	-0.22	-4.00	ns
H8: Digitalization → Entrepreneurship capabilities	-0.04	-1.2	ns
H9: Digitalization → Sustainability development	1.18	71.08	s

(ns = not significant, s = significant, *significant at $p < 0.05$, **significant at $p < 0.01$)

sustainability, underscoring its crucial role in fostering long-term development.

7. Discussion

The study highlights that digitalization enables women-led businesses to grow, though it may affect entrepreneurial skills. Family support and motivation emerge as crucial for sustainability, while challenges such as limited funding, competition, gender barriers, and balancing responsibilities hinder progress [12]. Unequal digital access and restricted networking opportunities further exacerbate difficulties. However, digital tools provide significant growth opportunities by enhancing capabilities and efficiency. Women entrepreneurs notably contribute to revenue generation, job creation, innovation, and environmental protection. Policymakers must strengthen support systems to enhance women's skills and motivation, fostering a sustainable entrepreneurial ecosystem aligned with the 2030 Agenda for sustainable development [13].

8. Conclusion

The study highlights that motivation and family support plays a key role in strengthening women entrepreneurs and fostering sustainable

development, while challenges continue to hinder their progress. Digitalization has a strong positive impact on sustainability but shows limited influence on improving entrepreneurial capabilities. These insights are valuable for policymakers aiming to promote women entrepreneurship. However, the study focused on a specific area and limited sample size affects its generalizability. Future research could use a longitudinal approach across diverse regions to examine how digitalization shapes women entrepreneurship over time and explore additional factors that contribute to long-term sustainability and digital growth.

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