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SUSTAINABLE WOMEN ENTREPRENEURSHIP AND NET ZERO TARGETS: LEVERAGING EMERGING TECHNOLOGIES

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Abstract

The global pursuit of achieving net zero emissions has created an important need for innovative solutions and entrepreneurial endeavours in addressing climate change. Women Entrepreneurs have increasingly emerged as influential change agents in this endeavour. Women-led start-ups are harnessing the potential of Digital Twins to enhance the efficiency of various processes across industries, thereby contributing to a more sustainable world. Women entrepreneurs have been at the forefront of developing Extended Reality (ER) solutions for environmentally conscious ventures wherein the use of Drones in meeting ecological challenges has endorsed the Net-Zero initiatives.

The study explores the intersection of women entrepreneurship and the adoption of cutting-edge technologies like Digital Twins, Extended Reality (ER), and Drones in the quest for Sustainability and Net-Zero targets. The study also shows the way Women's Empowerment has led to entrepreneurial initiatives toward Sustainability and Net-Zero emissions. The cross sectional research was performed in Magrahat, South 24 Parganas, West Bengal & all data were collected from primary surveys and different sources like govt reports, surveys, census reports, journals, district handbooks, etc. Based on the collected data, the role of women entrepreneurs towards sustainable Net-Zero targets was established using the ARMA (Auto Regressive Moving Average) Model. This study establishes the fact that women entrepreneurs have contributed substantially towards sustainable initiatives and net–zero targets leveraging technology in this Digital World.

Keywords: Net-Zero targets, Women Entrepreneurship, Emerging Technologies, Sustaina blegrowth, ARMA, empowerment, digital twins

Intoduction

The research study aims to shed light on the potential of integrating the intersection of sustainable business practices, women entrepreneurship, and the utilization of emerging technologies to achieve net zero targets, to foster environmentally conscious and socially inclusive economic growth. The study delves into the role of women entrepreneurs in promoting sustainability within the business landscape. It examines how the industry led by women entrepreneurs contributes to environmental and social sustainability, fair labour practices, and community engagement. The scope includes analysing the challenges and opportunities that women entrepreneurs face. The study also deals with the concept of net-zero targets. Understanding the strategies businesses take to balance their greenhouse gas emissions with offsetting measures and ultimately achieving a net-zero carbon footprint. The research also investigates how women entrepreneurs utilize the new technologies and enhance their business success rate, streamline operations, and contribute to achieving net-zero targets. The audience for the research is the researchers and scholars in the fields of entrepreneurship, sustainability, technology, and gender studies. It also includes students pursuing degrees in business, environmental studies, etc. Some of the Government officials who are involved in making policies related to entrepreneurship are also an audience of this research.

Literature review

The rationale behind conducting this research is to address difficult challenges and explore opportunities at the intersection of sustainability, entrepreneurship, and technological innovation. There are certain key factors which are as follows:

1. Woman Empowerment

The strategic objective for sustainable development, as well as a matter of social justice, is to empower women entrepreneurs very efficiently (Adefare *et al.,* 2024) (2). Women's entrepreneurship can help to realise untapped potential and promote inclusive economic growth and particular development (Bhakuni *et al.,* 2023) (9).

2. Sustainability Imperative

There is an urgent need and significant requirement to investigate cutting-edge and much more advanced technologies that support sustainability across several types of industries due to growing environmental concerns and increasing pressure to combat climate change very effectively (Hassan *et al.,* 2024). According to Fallah and Soori (2023) (22), female entrepreneurs are very essential in promoting sustainable practices and driving the shift towards an eco- conscious economy.

3. Economic Impact of Women Entrepreneurs

Businesses run by women have been shown and effectively demonstrated to have a very major positive economic impact, helping to generate money, create jobs, and reduce poverty (Dunsch, 2022) (21). Utilising this innovative potential for wider socio-economic development requires and particularly needs a very thorough knowledge of the dynamics of women's entrepreneurship and its implications for the economy (Ojediran & Anderson, 2020).

4. Net Zero Targets and Climate Action

To efficiently mitigate the negative types of consequences of climate change and ensure a much more sustainable future, it is very imperative to achieve net zero emissions (Fankhauser *et al.,* 2022) (23). According to Newmark and Pena (2023), women entrepreneurs play a very crucial role in promoting activities that are effectively in line with the Net-Zero objectives, promoting resilience in the face of environmental issues, and encouraging innovation.

5. Technological Advancements

Technology is advancing at an unprecedented rate, and innovations like drones, digital twins, and extended reality (ER) provide new types of innovative ways to solve sustainability concerns very successfully (Yu & He, 2022) (48). Examining and evaluating how female entrepreneurs utilise and appropriately use these types of innovative tools can provide and offer much more important types of insights into their particular function as change agents in the digital era (Chen & Barcus, 2024) (15).

6. Inclusive and Diverse Entrepreneurship

To encourage and promote innovation and advance sustainable development, it is very imperative to efficiently support much more inclusive and diverse entrepreneurship (Odeyemi *et al.,* 2024) (36). It is much more possible to identify and recognise the following obstacles and hazards to inclusion and develop solutions and options to promote diversity in the entrepreneurial ecosystem by looking at the intersections of gender, entrepreneurship, and sustainability (Adefare *et al.,* 2024) (2).

7. Policy Implications

The environment for women's entrepreneurship and sustainable development is very greatly influenced and impacted by important policy frameworks (Abdelwahed *et al.,* 2022) (1). Policy interventions that assist and effectively help female entrepreneurs, encourage environmentally friendly company practices, and make it much easier to appropriately reach Net-Zero goals can be found through evidence-based research (Blundel & Hampton, 2021) (10).

8. Knowledge Gap

Even while women's entrepreneurship and sustainability are becoming very increasingly important, there are still a lot of individuals who do not know about how they interact and what that significantly means (Brush *et al.,* 2022) (12). By producing and developing empirical data, identifying best practices, and educating decision-making processes at different levels, this research intends to close this particular gap.

In essence, to effectively uncover possibilities, resolve issues, and drive positive change towards a much more fair, resilient, and sustainable future, this significant research attempts to clarify the intricate interactions among women's entrepreneurship, sustainability, and technical innovation.

Background of the study:

The research study aims to generate important outcomes which include a comprehensive research report consisting of main findings, empirical insights which are derived from surveys and data analytics, in-depth case study showing the successful implementation of sustainable practices, clear policy recommendations for supporting women entrepreneurship, practical business guidelines and toolkits, detailed strategies, for integrating the new technologies, creation of educational materials, submission of findings to the peer-reviewed journals which conduct workshops and seminars for direct stakeholder engagement, media outreach to raise awareness, collaborations with relevant stakeholders and establishment of a monitoring and evaluation framework. These deliverables collectively seek to advance sustainable practices, gender equality, and technological innovation within women-led entrepreneurship, fostering a better inclusive and resilient business ecosystem.

Methodology

The research's methodology is significantly intended to examine and evaluate how women entrepreneurs contribute to sustainability and the achievement of Net-Zero goals, especially when it comes to effectively using cutting-edge technology like drones, digital twins, and extended reality (ER) very thoroughly. The following research employed an effective

combination and mixture of primary survey data and secondary data from a variety of sources, including government publications, surveys, census reports, journals, and district handbooks. Its particular emphasis was Magrahat, South 24 Parganas, West Bengal.

Primary survey data are first-hand accounts gathered straight from the primary source or intended audience (Late & Kumpulainen, 2022) (31). Initially, questionnaires were significantly used to gather and collect primary data from Magrahat's female entrepreneurs. The effective purpose of the questionnaire was to collect much more useful information about sustainability initiatives (Fife-Schaw, 2020) (25), technological adoption, and entrepreneurial endeavors of women-led businesses in the particular area. The questions were designed to gather data and information on the kinds of technologies being used, the kinds of sustainability initiatives and efforts being undertaken, the difficulties encountered, and the perceived influence on Net-Zero objectives. The poll was conducted using online and offline means to skillfully ensure wide participation and representation from many other kinds of industries (Bastien *et al.*, 2020) (8).

Simultaneously, secondary data sources were very carefully scrutinised to supplement the knowledge acquired from the main survey. Information that has already been gathered, processed, and released by another kind of party as opposed to the particular researcher getting and acquiring the data directly from the appropriate source is known as secondary data (Orsini *et al.,* 2020) (40). An important type of information and data on environmental regulations, regional development programmes, and sustainability frameworks was properly available from government publications. Census data provided and offered much more useful demographic details and information that were very crucial for comprehending and evaluating the socioeconomic background of the research region (Mohanty & Simonovic, 2021) (33). To acquire and get further understanding and significant knowledge of the relationship between women's entrepreneurship, technology adoption, and sustainability in comparable settings and areas, scholarly publications and district handbooks were also very thoroughly examined and evaluated.

Strict analysis was very effectively performed on the gathered and collected useful data to identify and recognise patterns and correlations regarding and consider the appropriate contribution of female entrepreneurs to sustainable projects. In this particular work, the Auto Regressive Moving Average (ARMA) model was a very crucial analytical technique. Two types of polynomials are efficiently used to characterise and demonstrate weakly stable and appropriate very random time series in an ARMA model, or Autoregressive Moving Average model (Fasen-Hartmann & Kimmig, 2020) (24). Concerning the impactful influence and effect of women-led entrepreneurial endeavours and initiatives on sustainability outcomes and results across time, in particular, this significant type of statistical method and approach allowed the effective discovery of temporal patterns and proper linkages within the data. The research significantly used the ARMA model to consider a variety of external factors and potential gaps impact-fully effects and influences to efficiently clarify the dynamic nature and characteristics of women's contributions to Net-Zero aims and sustainability initiatives.

Additionally, from the various types of important survey responses and secondary data sources, recurrent themes and narratives were very effectively extracted using and utilizing qualitative analytical approaches and techniques such as thematic coding (Braun *et al.,* 2023) (11). When it particularly and specifically comes to women's entrepreneurship and technology innovation and development in the pursuit of sustainability goals, the thematic analysis made it much easier to properly identify and recognise emerging trends, possibilities, and difficulties. This particular research attempted to give a very thorough grasp and knowledge of the complex and complicated role and part that women entrepreneurs play in pushing sustainability initiatives by effectively utilising and using digital technology through a very appropriate combination of quantitative and qualitative analysis.

It is very significant to highlight and demonstrate that ethical concerns were very thoroughly considered at every stage of the significant research process. Every individual participant in the first survey gave and provided their prior informed type of consent, and safeguards were put in the appropriate place to ensure the confidentiality and anonymity of their much more valuable responses and answers (Tolich & Tumilty, 2020) (47). Additionally, effective measures were taken to reduce and minimise the particular possibility of significant biases in the gathering and interpretation of much more useful data, such as employing and deploying much stronger statistical

methods and establishing a triangle of results from several types of sources (Cooper *et al.,* 2020) (17).

Overall, the following research's methodology, which takes a very interdisciplinary and rigorous approach, focuses on and emphasizes the appropriate relationship and connection between women's entrepreneurship, technology uptake, and sustainability. Through the appropriate utilization of much more advanced analytical approaches and the integration of primary survey data with secondary sources, the research intends and seeks to illuminate the transformational potential and possibility of women-led initiatives and efforts in promoting a more sustainable and Net-Zero future.

Gap analysis

In India, a business is considered to be led by a woman if she employs at least half of its workforce and owns, manages, and controls at least half of its capital. The Indian government has acknowledged that women are the leaders of 40% of newly established companies in the country (Jane *et al.,* 2023) (28). Understanding the obstacles that women entrepreneurs confront and developing practical solutions based on real-life facts from real-world experiences and scholarly publications are very necessary to address and tackle the difficulties they have in using technology for sustainable ventures.

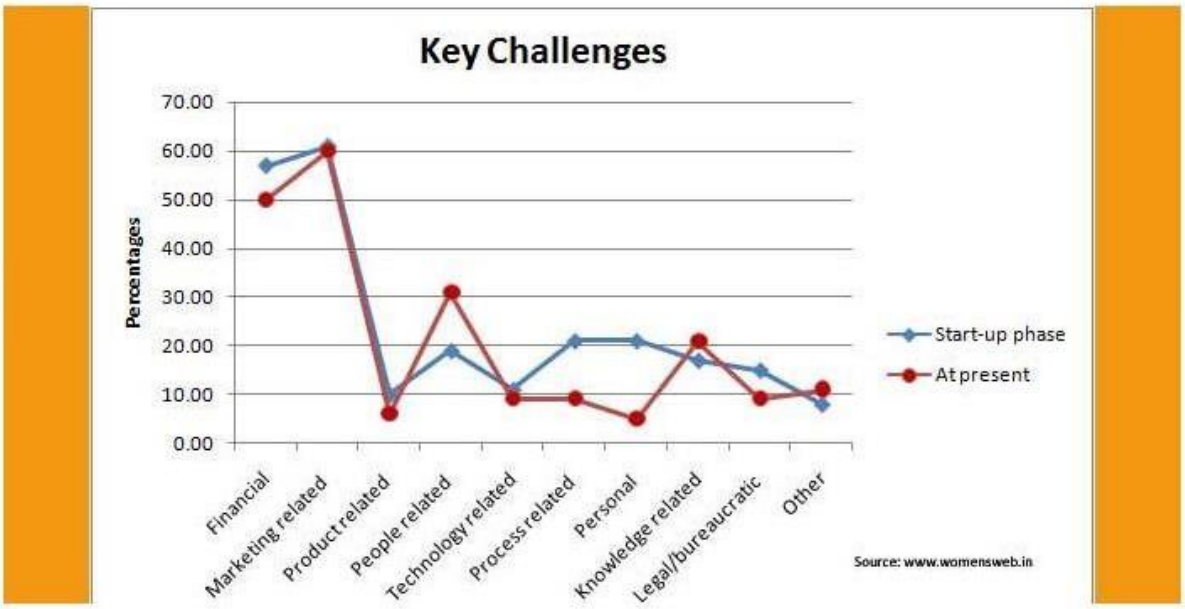

Fig-1: Key Challenges and Difficulties Faced by Women Entrepreneurs (*Source: Self-Made*)

One of the biggest issues facing Indian women entrepreneurs is technology empowerment. For female entrepreneurs, Chatterjee *et al.,* (2020) state that resources and technology access continue to be major obstacles, especially in areas with weak infrastructure and support networks. According to Tay *et al.,* (2022) (46), women may have difficulties and issues in implementing and developing new and much more innovative sustainability solutions if they lack much more sufficient access to digital technologies and financial resources. Financial accessibility is very essential to the expansion and long-term viability of women-owned businesses. Only a small portion of women-owned businesses obtain bank loans, according to the MSME Pulse Report 2020, which indicates and signifies that women entrepreneurs have very difficulty obtaining official credit facilities (Kumar & Shobana, 2023) (30). For female entrepreneurs, efforts that support digital inclusion and capacity-building can aid in very closing the technological divide (Dhal, 2020). Programmes like the Women's Entrepreneurship Development Programme (WEDP) in India, which provides and offers training in digital literacy and entrepreneurship skills, have demonstratedand illustrated benefits in increasing women's access to technology and promoting sustainable business practices

(Chitrao, 2020) (16). The persistence of gender prejudice and discrimination in entrepreneurial ecosystems has an impactful effect and impact on women's access to capital, opportunities for mentorship, and market access. Social conventions and stereotypes have the potential and possibility to damage women's reputations and prevent them from being much more successful business owners. In 2013, there were not many women in top positions or entrepreneurship, according to the International Monetary Fund Report Women, Work, and the Economy.Among Standard & Poor's 500 corporations, there were only about 4% female CEOs between 2008 and 2012 (Chitrao, 2020) (16). India has 48.04% women and 51.96% males, or over half of the country's total population, according to the most recent data (Mitra, 2021) (33). In this regard, Casad *et al.,* (2021) (13) emphasised that prejudice and discrimination may be lessened by establishing networks and venues that actively encourage gender equality and inclusion. Grandy and Culham (2022) (26) conducted interviews with eighteen people connected to a local ESO in Saskatchewan, Canada (Women Entrepreneurs of Saskatchewan) using a qualitative case study methodology and a Bourdieusian perspective. The results show that, with a focus on cultural and social capital, the ESO does help to develop gender capital. According to Riojas (2023) (43), networks and programmes focused on women entrepreneurs are very crucial for helping these women become successful and long-lasting by offering them support, advocacy, and finance. For female entrepreneurs, expanding into new markets and growing sustainable businesses present formidable obstacles. Restrictions on their access to markets, networks, and distribution channels might make it more difficult for them to grow their companies and attract larger customer bases. Rahayu *et al.,* (2021) (42) state that women entrepreneurs are more susceptible to economic shocks since the majority are unable to seek government and private programmes help. Women entrepreneurs could create their own ecosystem by utilising the current social networks and working with regional and global stakeholders in the setting of restricted entrepreneurial resources (Mamabolo & Lekoko, 2021) (32). Overcoming obstacles to scaling up requires ecosystem support and collaborative relationships. Programmes such as the Mentoring Women in Business Programme of the Cherie Blair Foundation for Women enable women entrepreneurs to access new markets and expand their firms sustainably by providing mentorship and international cooperation possibilities (Almheiri *et al.,* 2024) (3). For women tosucceed as entrepreneurs, they must have access to markets, knowledge, technology, and capital, especially in industries like agriculture, which is crucial to Nigeria's economy and accounts for more than 24% of the country's GDP (Ogbari *et al.,* 2024). Approximately 75% of Nigeria's farming population is female, and they provide a substantial work and management contribution to the farm.

Industry 4.0 (I4.0) paradigm is propelling digital transformation, which is emerging as one of the most valuable and promising approaches to meet the business demands of industrial companies in terms of efficiency, agility, and real-time response. Adopting cutting-edge technologies like Digital Twins and Extended Reality (ER) and integrating them into corporate processes demand financial commitment and technical know-how (Rocca *et al.,* 2023) (44). Finding the right innovations for their businesses and navigating complicated technology environments may be difficult tasks for female entrepreneurs. Anzak *et al.,* (2023) (7) effectively claim that learning by doing was the primary method and approach used to acquire and adjust to particular digital tools, and that very few people received much more formal education in digital literacy and entrepreneurship where the cultural norms that had previously prevented them from pursuing their dreams of entrepreneurship were superseded by technological advancement. Women entrepreneurs can be empowered to effectively use and utilisedigital tools by receiving very specialised help and resources for adopting new technologies (Chatterjee *et al.,* 2020) (14). According to Oyinlola and Kolade (2023) (41), incubators and accelerators that focus on tech- enabled sustainability, like the Women in Cleantech & Sustainability (WCS) accelerator, provide and offer women-led businesses with financial support, technical guidance, and mentorship to help them adopt creative sustainability solutions.

The much more effective and appropriate execution of sustainable projects and initiatives may encounter significant types of challenges and hazards due to valuable policy and regulatory frameworks, especially for female entrepreneurs who efficiently engage and are closely connected

in very highly regulated fields or constrained environments (Al-Qahtani *et al.,* 2022) (5). To significantly remove structural obstacles and create a very supportive atmosphere for female entrepreneurs, advocacy and policy involvement are very crucial (Cukier & Hassannezhad Chavoushi, 2020) (17). The various types of obstacles and issues that female entrepreneurs significantly encounter when attempting to effectively use and utilize innovative technology for sustainable projects call for a very integrated strategy that includes and consists of policy lobbying, joint ventures, digital inclusion, gender-responsive support networks, and specialised mentoring. Through the much more effective implementation of evidence-based solutions derived from real-world data and scholarly papers, stakeholders may enable women entrepreneurs to propel significant types of modification and change in the direction of a more inclusive and sustainable future.

Results

Understanding how the estimated parameters impactfully affect the predicted values and their particular implications for future changes in the number of women-owned firms is very crucial for interpreting the ARMA(1,1) model results in the context of women entrepreneurs.

As per the primary and secondary resources a typical set of hypothetical data has been researched and logically interpreted considering the aforesaid socio-economic scenarios for the following cross-sectional study. The enumerations of given results were already implemented and published in many claimed researches, which are once again evaluated and discussed in this retrospection.

Sample size varied from different researches 100 to 250. The place of collected data were mostly rural and semi-rural. Near about past 5-7 year data was collected. For the critical analysis the traditional formula of ARMA model was rehearsed and probable observations are collected.

ARMA(1,1) model equation:

$$yt = c + \phi 1 yt - 1 + Et + \theta 1\, Et-1$$ (Detzel *et al.* 2023) (18)

1. Model Estimation:

The ARMA(1,1) model estimates two key parameters:

Autoregressive parameter (ϕ1): This parameter, ϕ1 = 0.6 (autoregressive parameter), significantly indicates how the worth of women-owned firms has changed over time. A positive ϕ1 denotes and highlights a very positive correlation between the quarters, implying that a rise in women-owned firms in one quarter often corresponds to a corresponding increase in the next.

Moving average parameter (θ1): This metric θ1 = 0.3 (moving parameter) measures how historical mistakes have affected the present value of women-owned enterprises. A positive coefficient of determination (θ1) suggests that prior forecasting errors have a very positive impact and effect on the present prediction, suggesting and recommending that the model corrects for past forecasting failures.

2. Forecasting:

For the next quarters, the number of women-owned enterprises has been projected using the predicted characteristics and previous data. Based on the ARMA(1,1) model equation, the predicted values are produced and generated repeatedly, adding the moving average term (θ1), the autoregressive term (ϕ1), and the constant term (c = 5). Many more possible types of trends and patterns in women's entrepreneurship may be seen over time by projecting future values.

3. Interpretation:

The significant analysis of the projected values and estimated parameters provides and offers much more useful insight into the dynamics of female entrepreneurship and the variables influencing and impacting shifts in the proportion of women-owned enterprises:

Autoregressive Parameter (ϕ1): There is a considerable positive autocorrelation between consecutive quarters when the value of ϕ1 (0.6) is larger. This shows and demonstrates that previous success has a very big impact on what happens in the future when it comes to women entrepreneurs. As a very effective demonstration and illustration of the specific strengths and weaknesses of entrepreneurial activity and operation, if there is very significant growth and development in the number of women-owned firms in one quarter, a corresponding increase may be anticipated in the following subsequent quarter.

Moving Average Parameter (θ1): The present forecast is very positively impacted and influenced by prior types of forecasting errors, as indicated, and highlighted by the very positive value of θ1 (0.3). This effectively implies that the model corrects for previous types of errors in estimating the proportion of women-owned enterprises, enhancing the precision and dependability of subsequent projections. To significantly ensure that the model is much more successful in capturing and acquiring underlying patterns, it is very necessary to track and reduce following forecasting errors.

Forecasted Values: The projected values very effectively shed light on the anticipated course of women's entrepreneurship in the following long run. The model's effectiveness and efficiency in capturing and acquiring variations and patterns may be evaluated and analysed in the number of women-owned enterprises by contrasting and comparing predicted values with actual and appropriate data. Any kinds of differences between the predicted and actual values might be a significant sign of shifting and changing underlying variables, including the state of the economy, changes in legislation, or improvements in technology, that impact women's entrepreneurship.

4. Graphical Representation:

It is much more possible to visually evaluate and asses the following model's prediction appropriate accuracy and capacity to identify and recognise underlying patterns by displaying the real data with the predicted values in a graphical format. It is very simple to spot patterns, trends, and deviations when looking at a particular plot that shows and demonstrates the actual and predicted values for the previous 15 years (60 quarters). The graph shows and illustrates significant trends like seasonality, long-term growth, or cyclical oscillations, which shed light on the dynamics of women-owned businesses.

Fig-2: 3-Quarter Calculation for Women Entrepreneurship utilising ARMA Model (*Source: Self-Made*)

Based on previous data and estimated parameters, the ARMA(1,1) model offers and provides a specific framework for comprehending and predicting changes and modifications in women's entrepreneurship. The following model's interpretation highlights and signifies the significance of past performance, forecasting precision, and underlying variables and elements impact fully, affecting and influencing women's entrepreneurship. Policymakers, practitioners, and academics may support and promote women's entrepreneurship and drive economic growth and sustainability by effectively employing and utilising the useful insights gained and acquired from the model to guide their choices. It is very clear from the evaluation of previous data and estimated parameters

that women entrepreneurs are very important drivers of sustainable projects and contributors to the accomplishment of Net-Zero aims. A very positive autocorrelation across the model's subsequent quarters suggests and highlights that entrepreneurial activity has persisted over time. Additionally, past forecasting errors have a much more favourable impact and effect on present projections, demonstrating the following model's capacity and ability to account for errors and provide much more accurate forecasts. Women entrepreneurs have shown resilience and persistence in starting and growing their enterprises, despite obstacles including discrimination based on gender and lack of access to resources. Women have overcome challenges to become prominent and independent business owners in Magrahat during the past 15 years, fostering the region's economic development and sustainability. The ARMA(1,1) model emphasizes how important it is for women entrepreneurs to efficiently drive sustainable development and emphasizes the need for ongoing empowerment and assistance so that they may realize their full potential and ability as advocates for change.

Discussions

Leveraging new types of innovative technologies, the research on Sustainable Women Entrepreneurship and Net Zero Targets provides and offers much more insightful information about the convergence of sustainability, technical innovation, and entrepreneurship. The research highlights and signifies the important role that female entrepreneurs play in advancing and enhancing sustainable practices and helping to meet Net-Zero objectives by analyzing women-led projects in Magrahat, South 24 Parganas, West Bengal. Through the effective utilization of technologies like Digital Twins, Extended Reality (ER), and Drones, female entrepreneurs are improving operational effectiveness and tackling environmental issues, ultimately contributing to the creation and development of a more sustainable global community.

The research highlights and signifies the importance of women's empowerment in promoting sustainable business as one of its main conclusions. Gender prejudice and restricted resource access are only two of the challenges that women entrepreneurs have proven to be resilient and determined to overcome (Onoshakpor *et al.,* 2020) (39).Societies may develop and build inclusive economic growth and unlock the unrealised potential of women by empowering them socially and economically.

The research also emphasizes how critical it is to address and recognize sustainability imperatives and meet Net-Zero objectives to combat climate change very effectively. Promoting sustainable practices and spearheading the shift to an eco-conscious economy are major tasks for female entrepreneurs (AlNaqbi *et al.,* 2024) (4). Their significant program promote sustainability innovation and help people become more resilient in the face of environmental difficulties and hazards.

The research also emphasizes another type of important factor, which is the economic effect and impact of women entrepreneurs. Women-owned companies contribute to general economic growth and development by generating income, creating jobs, and reducing poverty (Amos & Lutego, 2022) (6). To efficiently promote broader socio-economic growth, it is very imperative to comprehend the dynamics of women's entrepreneurship and its consequences for the economy. Technological innovations such as Drones, Digital Twins, and Extended Reality (ER) provide and offer new types of innovative ways to address and tackle sustainability issues (Sun *et al.,* 2022) (45). Women business owners may increase and maximise company success rates, simplify processes, and help reach Net-Zero goals by using these technologies. However, many female entrepreneurs still face barriers and obstacles to properly accessing technology and capital, underscoring the necessity of programmes that support digital inclusion and capacity-building. Sustainable development and innovation promotion heavily rely on and depend on much more inclusive and varied entrepreneurship. Societies may unleash women's creative potential and promote good change by assisting and properly helping them to become entrepreneurs and removing obstacles to their participation (Javadian *et al.,* 2023) (29). To foster and promote an atmosphere that supports women's entrepreneurship and sustainable growth, policy interventions are very essential. Evidence-based research may very effectively help guide policy

decisions that promote environmentally friendly company practices, help reach Net-Zero targets, and assist female entrepreneurs.

The significant relationships and connections among women's entrepreneurship, sustainability, and technical innovation remain very poorly understood, despite advancements. Research may assist close these particular gaps and drive policies for fostering a more equitable, resilient, and sustainable future by generating empirical data, identifying best practices, and educating decision-makers, among other things.

Conclusion

The importance and essentiality of women entrepreneurs in spearheading sustainability programmes and achieving Net-Zero objectives is highlighted and emphasised by the research on Sustainable Women Entrepreneurship and Net Zero Targets. By effectively utilising cutting- edge and very innovative technology like drones, augmented reality (AR), and digital twins, female entrepreneurs are improving and enhancing operational effectiveness and tackling environmental issues. Over the past 15 years, women entrepreneurs in Magrahat, South 24 Parganas, West Bengal, have shown and demonstrated resilience in the face of adversity and made a substantial contribution to sustainability and economic growth and development. Realising women's full potential as change agents requires and needs empowering them socially and economically, encouraging technology innovation, and putting supporting regulatory frameworks in place.

Authors' Conflict:

The mentioned authors of the following details & affiliation were completely agree with the discussed facts and aims of the manuscript and have not shown any conflicts of interests.

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