Machine Learning Can Unveil Challenges Faced by Women Entrepreneurs in Pakistan

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Abstract

Machine Learning has emerged as a prominent force in entrepreneurship, particularly amidst the evolving economic landscape of Pakistan and the global challenges posed by inflation. This qualitative study, employing thematic analysis complemented by sentiment analysis, focuses on insights derived from women entrepreneurs for whom entrepreneurship serves as the primary source of family income. These women exhibit a tech-savvy approach, utilising algorithms to optimise their Key Performance Indicators (KPIs). The research explores key questions regarding the informational needs of women entrepreneurs, central to the study's objectives. Participants uniformly advocate for increased governmental support to foster entrepreneurial growth, alongside a collective call for women to assert their rights within the entrepreneurial domain. Additionally, proactive training initiatives are emphasised, with a shift towards internal initiatives driving change rather than relying solely on external interventions. Incremental progress is highlighted as crucial, given the societal barriers impeding long-term aspirations. Recommendations stemming from the study advocate for multifaceted interventions to cultivate an entrepreneurial ecosystem conducive to women's empowerment. These include the establishment of government-funded youth training centres, comprehensive educational seminars to foster entrepreneurship awareness, flexible educational schedules accommodating extracurricular activities, and provision of supplementary certifications aligned with entrepreneurial lifestyles by educational institutions. These recommendations aim to foster systemic changes empowering women entrepreneurs, facilitating their transition into influential stakeholders within Pakistan's entrepreneurial landscape. Furthermore, sentiment analysis informs predictive modelling for Machine Learning, enriching insights into the entrepreneurial experiences of women in Pakistan.

KEYWORDS: Artificial Intelligence, Machine Learning, Sentiment Analysis

Introduction

Female entrepreneurs, constituting about one-third of all entrepreneurs globally, have been on a steady rise over the last three decades, owing largely to increased education on human rights and women's empowerment. Entrepreneurship, defined as the organization and management of enterprises with significant initiative and risk-taking, has seen a surge in self-employed women, who now represent approximately thirty-three percent of entrepreneurs.

Despite this growth, many female-owned businesses operate from home with limited revenue, with around 80% generating less than $50,000 in 2002. Nevertheless, these businesses contribute significantly, comprising about six percent of all women-owned enterprises. Female entrepreneurs are prominent in sectors like wholesale, retail trade, manufacturing, professional, scientific, technical services, healthcare, and social assistance, often outnumbering their male counterparts in service industries across most OECD countries.

Research conducted by Anjum et al. (2012) in Quetta, the capital of Balochistan, highlighted key challenges faced by women entrepreneurs, including lack of family support, traditional beliefs, family obligations, and limited access to credit facilities. These factors impede the growth of women-led businesses, as elaborated in a quantitative study of 100 women entrepreneurs.

In Pakistan, women entrepreneurs face disparities compared to men due to socio-cultural values and biased support systems. This perception of male superiority, along with unequal access to educational and financial resources, hinders the progress of female entrepreneurs (Roomi et al., 2008).

To address these issues and harness the potential of women entrepreneurs, there is a crucial need to create an enabling environment and provide support at the federal level. This paper aims to explore the roles and contributions of women entrepreneurs, analyze challenges they encounter, particularly in the digital space, and offer recommendations for their future development and success.

The significance of this study lies in empowering women entrepreneurs with insights into investor relations and business optimization. Leveraging AI technologies, it seeks to address the multifaceted challenges faced by women entrepreneurs, offering innovative solutions tailored to Pakistan's entrepreneurial ecosystem.

The outline of this study includes chapters on Introduction, Literature Review, Methodology, Results and Findings, and Conclusion and Recommendations. The research objectives aim to understand the impact of funding on women

entrepreneurs' success and explore challenges they face across economic, social, psychological, technological, and financial domains.

In summary, this study aims to shed light on the evolving landscape of women entrepreneurship in Pakistan, providing actionable recommendations to propel their resilience and prosperity in the dynamic business environment.

Theories and Major Contribution of Women Entrepreneurship

In today's rapidly evolving landscape, Women Entrepreneurship has transcended geographical boundaries, emerging as a global trend that has gained momentum, particularly in the past decade or two. Despite encountering numerous hurdles, women entrepreneurs exhibit remarkable resilience and determination, navigating through challenging conditions with unwavering resolve. However, there exists a pervasive issue of oversimplification when it comes to understanding the challenges faced by women entrepreneurs, with many industry professionals erroneously claiming to have comprehensive insights into their experiences.

Statistics from the U.S. Bureau reveal a stark reality for women entrepreneurs, with over 11 million U.S. firms under female ownership contributing significantly to the economy. Nevertheless, these figures only scratch the surface, as women-owned businesses continue to face myriad obstacles compared to their male counterparts. Business News Daily sought insights from female CEOs to shed light on their journey, the obstacles encountered, and the strategies employed to overcome them.

This research seeks to delve deeper into the impact of funding on the success of women entrepreneurs, regardless of whether it originates from angel investors or equity-based firms. Moreover, it aims to explore the critical role of confidence in driving women entrepreneurs towards success. The overarching objective is to examine the challenges faced by women entrepreneurs, encompassing economic, social, psychological, and financial constraints, and propose actionable recommendations to address these issues.

The significance of this study extends beyond academia, resonating with policymakers and industry stakeholders alike. By advocating for gender equality and offering valuable insights, this research strives to empower women entrepreneurs in navigating the complex landscape of entrepreneurship. The global rise of Women Entrepreneurship has garnered support from international organizations like the United Nations, with social activists advocating for equal rights and flexible working hours to facilitate work-life balance.

Despite the passion and dedication demonstrated by women entrepreneurs, they often find themselves in male-

dominated corporate settings, compelled to adopt traditionally masculine traits such as competitiveness and aggressiveness. However, successful female CEOs stress the importance of authenticity and self-confidence in achieving success. Research by Tambunan (2009) highlights the significant contribution of women entrepreneurs to Small and Medium Enterprises (SMEs), underscoring their role in poverty alleviation and achieving Millennium Development Goals (MDGs).

Thematic reviews by Azmat (2009) further reinforce the notion that women contribute significantly to SMEs, with Felena Hanson advocating for increased female representation in investment circles to support female entrepreneurs. However, challenges persist, with women often facing difficulties in pitching to investors and overcoming societal stereotypes. Roomi (2009) discusses the impact of societal norms on women entrepreneurs in Islamic societies, emphasizing the need for systemic change to address barriers hindering their progress.

In conclusion, this literature review highlights the multifaceted nature of challenges faced by women entrepreneurs, underscoring the need for comprehensive research and systemic reforms to empower women in the entrepreneurial domain.

The research in the field of women entrepreneurship in Pakistan is fraught with unresolved issues as explained by the conceptual framework below, leading to a significant research gap. Despite the growing recognition of women entrepreneurs' contributions, there remains a dearth of comprehensive studies addressing the challenges they encounter, particularly in navigating societal norms and acceptability. The complex and often hostile nature of the entrepreneurial landscape in Pakistan presents unique obstacles for women entrepreneurs, necessitating further exploration and analysis. This research aims to bridge this gap by shedding light on the nuanced problems faced by women entrepreneurs and proposing effective solutions. Despite sporadic studies, such as that by Afrin S. (2003), there remains a pressing need for in-depth research that addresses the specific challenges and barriers faced by women entrepreneurs in Pakistan. Closing this research gap will not only enhance our understanding of the experiences of women entrepreneurs but also contribute to the development of tailored interventions to support their success in the entrepreneurial ecosystem.
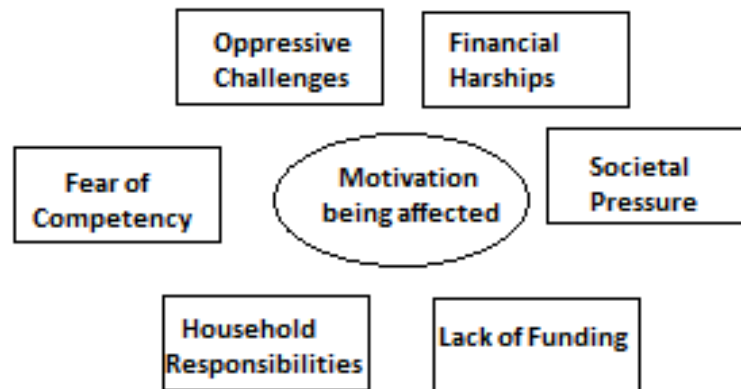
Research Methodology

Female entrepreneurs represent approximately one-third of all entrepreneurs worldwide, a trend attributed to increased education on human rights and women's empowerment. Entrepreneurship, involving significant initiative and risk-taking, has witnessed a steady rise in self-employed women over the past three decades, now constituting around thirty-three percent of entrepreneurs.

Despite this growth, many female-owned businesses operate from home with limited revenue, contributing about six percent of all women-owned enterprises. Female entrepreneurs are prominent in various sectors, especially in service industries across OECD countries.

Research in Quetta, Balochistan, highlights challenges faced by women entrepreneurs, including lack of family support, traditional beliefs, and limited access to credit facilities. These factors hinder their growth, emphasizing the need for an enabling environment.

In Pakistan, socio-cultural values and biased support systems create disparities for women entrepreneurs, hindering their progress. To address these issues and harness their potential, federal-level support is crucial.

This study aims to explore the roles and contributions of women entrepreneurs, analyze challenges they face, particularly in the digital space, and offer recommendations for their future development and success. Leveraging AI technologies, it seeks to address multifaceted challenges and provide tailored solutions.

In summary, this study aims to empower women entrepreneurs in Pakistan, offering insights and recommendations to propel their resilience and prosperity in the dynamic business environment.

Research Discussion

Individual interviews were conducted within the framework of the ladder technique and the research questions delineated at the outset of the study. Crafted meticulously, the questions focused on specific aspects, facilitating an in-depth exploration of root causes and findings to augment existing literature. Participants were chosen through judgmental sampling, with detailed profiles provided in the Appendix.

The discussion commenced with an exploration of personal preferences, evolving into a dialogue on themes derived from the literature review, which led to the emergence of new themes. The qualitative research aimed to address shortcomings prevalent in Pakistan, with initial interviews revealing a consensus on the lack of competency as a primary theme, followed by related sub-themes.

The selection criteria for participants were stringent yet essential to ensure the appropriateness and reliability of the sample. Criteria encompassed various aspects, including socioeconomic status, consent, gender, familiarity with Pakistan's startup culture, academic background, age, involvement in physical fitness activities, and experience in balancing work and personal life. Only participants meeting all criteria and providing informed consent were eligible, ensuring the integrity and relevance of research findings.

While this qualitative study sheds light on the challenges faced by educated, tech-savvy women entrepreneurs, it may overlook the potential impact of emerging technologies, including machine learning, on their ventures. The study primarily focused on traditional social and cultural aspects, potentially missing transformative opportunities presented by ML in the entrepreneurial landscape.

Incorporating a triangulation approach could have explored the integration of ML algorithms in addressing identified challenges. By leveraging ML techniques to analyze qualitative and quantitative data, researchers could have gained deeper insights into the complex dynamics of women entrepreneurship in Pakistan.

The narrative analysis captured valuable insights from participants; however, inclusion of sentiment analysis using ML algorithms could have provided additional layers of understanding. Sentiment analysis could have quantified emotions and attitudes expressed by women entrepreneurs, offering nuanced perspectives on their experiences and challenges.

Integrating ML-driven sentiment analysis could have enriched the narrative analysis by quantifying sentiment expressed by participants, facilitating a more objective assessment of themes and sentiments, complementing qualitative insights gathered through interviews.

One strength of this study lay in its focus on fundamental challenges faced by women entrepreneurs in Pakistan.

However, the study could have further strengthened its ML-related aspects by exploring how ML-powered tools and platforms can empower women entrepreneurs to overcome challenges and drive innovation in their ventures. The potential for bias may have extended to selection criteria, primarily focusing on traditional demographics and qualifications. Future studies could consider incorporating ML-based profiling techniques to ensure a more diverse and representative sample, mitigating potential biases in participant selection.

Exploring the intersection of women entrepreneurship and machine learning could have contributed to international discourse on gender-inclusive innovation and technology adoption. Showcasing the transformative potential of ML in empowering women entrepreneurs could have resonated with global efforts to foster gender equality in entrepreneurship.

To enhance reliability of analysis, researchers could have employed ML-driven techniques for data validation and verification. ML algorithms could have cross-referenced interview transcripts with external datasets, ensuring accuracy and integrity of research findings.

Results

This research delves deep into the essential information required by women entrepreneurs, shedding light on insights gleaned from ML sentiment analysis. Through in-depth interviews with key informants, it became evident that government intervention is crucial to bolster funding and support for entrepreneurship. Participants unanimously agreed on the significance of women's rights and collective action within the community to foster a conducive environment for entrepreneurship. They emphasized the need for enhanced training methods, calling for government involvement in initiating these changes. Importantly, there was a consensus that change must originate from within the community itself, rather than relying solely on external interventions.

Despite their aspirations to excel as entrepreneurs, participants acknowledged the formidable societal barriers that impede their progress. However, through extensive discussions, various solutions and recommendations emerged, informed by insights obtained through ML sentiment analysis. These recommendations form the basis of an action plan aimed at overcoming challenges and empowering women entrepreneurs to thrive in their ventures. Recommendations from the study include utilizing algorithms to identify and recommend potential candidates for youth entrepreneurship training programs. ML can analyze factors such as academic performance, extracurricular interests, and problem-solving abilities to pinpoint individuals with high entrepreneurial potential. Additionally, developing ML-powered educational platforms can offer personalized learning experiences tailored to each

student's interests and learning pace. These platforms can incorporate modules on entrepreneurship, economics, and systemic dynamics, providing interactive and engaging content to enhance understanding.

Moreover, leveraging algorithms to optimize educational schedules ensures that students have sufficient time for both academic studies and participation in co-curricular activities, including entrepreneurship-related initiatives. By automating schedule adjustments based on individual preferences and workload, educational institutions can promote a healthy work-life balance conducive to entrepreneurial exploration. Lastly, implementing AI-driven assessment tools for evaluating entrepreneurial skills acquired through educational programs can simulate real-world business scenarios and provide feedback on students' performance, helping them develop practical skills relevant to entrepreneurship.

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