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The Role of Technologies on Women Entrepreneurship: A Case Study of Online University

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Abstract. This study delves into the dynamic nexus between technology and women entrepreneurship within the context of online universities. It embarks on a comprehensive exploration through a literature review, scrutinizing the transformative impact of Information and Communication Technology (ICT) on women's entrepreneurial endeavors while elucidating associated challenges. With three distinct research objectives, the study aims to dissect the influence of ICT on women's entrepreneurship, assess the efficacy of technological tools, and unearth strategies for bolstering the role of women entrepreneurs in online university landscapes. Methodologically, the research leverages a survey-based approach, engaging a sample population of 50 women enrolled in online university entrepreneurship programs across diverse disciplines such as medicine, journalism, and economics. The analysis of the survey data unveils a spectrum of perceptions regarding ICT infrastructure, the instrumental role of ICT tools, and perceived obstacles and opportunities encountered by women entrepreneurs. Drawing insights from the findings, the study puts forth actionable recommendations to harness technology effectively in fostering the growth and empowerment of women entrepreneurs within online educational milieus. Ultimately, this research contributes to a nuanced understanding of the intricate interplay between technology and entrepreneurship, particularly in the context of online universities, while advocating for strategies to enhance women's participation and success in entrepreneurial ventures.

Keywords: Women Entrepreneurship, Technology, Online University, ICT Infrastructure, Empowerment.

1. Introduction

In the realm of entrepreneurship, the integration of technology, particularly Information and Communication Technology (ICT), has become instrumental in shaping the landscape of women's entrepreneurship globally. This introduction endeavors to explore the multifaceted impact of technology on women's entrepreneurial endeavors, with a specific focus on the context of online universities. By synthesizing insights from a diverse array of scholarly research, this study aims to provide a comprehensive understanding of the dynamic relationship between technology and women's entrepreneurship, while shedding light on pertinent challenges and opportunities [1],[2].

At the core of this discourse lies the recognition of technology as a catalyst for fostering inclusivity and empowerment within the entrepreneurial ecosystem. Research by Smith et al. underscores the transformative potential of ICT in overcoming traditional barriers and enabling women to establish and scale their ventures effectively [1]. Moreover, studies by Chen et al. and Johnson et al. highlight the role of technology in facilitating access to entrepreneurial resources, networks, and markets, thereby enhancing the economic participation and agency of women entrepreneurs [2], [3].

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Empirical evidence further supports the positive correlation between technology adoption and the performance of women-led businesses. [4] demonstrate the significant contribution of technology-enabled strategies in driving the growth and profitability of female-owned enterprises across diverse sectors and regions. Additionally, research by [5] elucidates the transformative effects of ICT on women entrepreneurs in developing economies, where technology serves as a catalyst for socio-economic empowerment and poverty alleviation.

Furthermore, the emergence of online universities as hubs of entrepreneurial education and innovation has expanded the horizons of women's entrepreneurship. Quraishi et al. explore the integration of technology within online university curricula, offering insights into how digital literacy and ICT skills can empower women to succeed as entrepreneurs in the digital age [6]. Similarly, research by [7] delves into the challenges and opportunities of incorporating big data technologies within higher education settings, highlighting the potential of technology-driven insights in fostering entrepreneurship education.

In addition to empirical research, theoretical frameworks provide valuable perspectives on the mechanisms through which technology influences women's entrepreneurship. Walsham's reflections on ICT4D research offer insights into the historical evolution and future trajectories of technology-enabled initiatives, emphasizing the need for context-specific approaches to leverage technology for inclusive growth [8]. Similarly, studies by Park et al. and Garrett et al. underscore the importance of ethical considerations in technology adoption, advocating for responsible and equitable deployment of ICT in entrepreneurial ecosystems [9], [10]. By synthesizing insights from these diverse strands of literature, this study aims to contribute to a nuanced understanding of the intricate interplay between technology and women's entrepreneurship within the context of online universities. Through empirical analysis and theoretical inquiry, it seeks to offer actionable recommendations to harness technology effectively in fostering the growth and empowerment of women entrepreneurs, thereby advancing gender equality and inclusive economic development.

The problem statement addresses the challenges and opportunities surrounding the integration of technology in women's entrepreneurship within the framework of online universities. Despite advancements in technology, women entrepreneurs face persistent barriers related to access, digital literacy, and gender biases, limiting their ability to leverage technology for business growth and innovation. Moreover, the unique socio-economic contexts of women entrepreneurs in developing countries exacerbate these challenges, underscoring the need for tailored interventions and support mechanisms. Additionally, the rapid evolution of technology presents both opportunities and risks for women entrepreneurs, necessitating a nuanced understanding of the implications of technological advancements on their ventures. Therefore, the problem statement seeks to elucidate the key obstacles hindering women's entrepreneurial success in online university settings while identifying strategies to harness technology effectively to promote gender-inclusive entrepreneurship and economic empowerment.

Self-medication In the contemporary business landscape, the role of technology in shaping entrepreneurship, particularly for women, has garnered significant attention. This literature review examines the influence of various technological factors on entrepreneurship, drawing insights from a range of studies. The focus is on understanding how technological innovations impact the growth and success of entrepreneurial ventures, with a particular emphasis on women entrepreneurs [1], [2], [3].

Technological innovations play a crucial role in shaping the growth trajectory of businesses, as highlighted by [6], who explored the interacting effects of uncertainties and institutional forces on information sharing in marketing channels. Additionally, [7] conducted a case study on technological innovations and their influence on the growth of auto component SMEs in Bangalore, demonstrating how technology drives innovation and competitiveness among small and medium-sized enterprises. Moreover, the study by [8] examined the impact of information technology on e-commerce growth, emphasizing the transformative potential of technology in creating new opportunities for entrepreneurs in the digital marketplace. [9] explored a handover prioritizing scheme for reducing call failure probability in cellular wireless networks, showcasing how technological advancements can enhance operational efficiency and reliability in business operations.

Furthermore, [10] studied the effects of information technologies on university students, shedding light on the broader implications of technology on various aspects of society, including education and entrepreneurship. [11] reflected on the history and future agenda of ICT4D research, providing insights into the evolving role of technology in addressing development challenges and fostering economic growth. In the realm of entrepreneurship, ICT has emerged as a powerful enabler, as evidenced by the comparative analysis conducted by [12] between Portugal and Germany. Similarly, [13] explored the impacts of ICT on Greek entrepreneurship in alignment with governmental programs, highlighting the role of policy interventions in leveraging technology for entrepreneurial development.

Furthermore, studies such as those by [14], [15], [16] delve into the nuanced dynamics of women entrepreneurship in the context of technological empowerment, addressing issues such as digital gender divide, the role of ICT in empowering women in emerging economies, and the modern challenges and opportunities faced by women entrepreneurs. Examined the role of technology in increasing the motivation of millennial women entrepreneurs, while [17], [18] proposed a conceptual model for empowering women entrepreneurs in emerging economies. Additionally, [19] explored user innovation and entrepreneurship in virtual worlds, highlighting the potential for technology to foster entrepreneurial creativity and collaboration.

The role of technology in fostering women entrepreneurship, particularly in online university settings, has gained significant attention in recent years. [26] explore the challenges and opportunities of e-learning for women's education in developing countries, providing insights relevant to the integration of technology in educational platforms. Additionally, [27] discuss the integration of mobile learning technologies in Afghanistan universities, highlighting potential opportunities and challenges for leveraging technology in educational contexts. [28] investigate the integration of big data technologies in higher education settings, offering valuable perspectives on the technological landscape within academic institutions. Furthermore, the study by [29] delves into empowering students through digital literacy, emphasizing the importance of digital skills in contemporary education.

The transformative power of information and communication technology in empowering women, as explored by [25], provides relevant insights into the potential impact of technology on women entrepreneurs. Additionally, [24] discuss fostering women's empowerment through e-commerce in Afghanistan, shedding light on the role of technology in enabling economic opportunities for women. These studies collectively underscore the multifaceted relationship between technology and women

entrepreneurship, offering valuable perspectives on the integration of technology in educational and economic contexts.

The research aims to delve into the intricate relationship between Information and Communication Technology (ICT) and women's entrepreneurship within the framework of an online university setting. It seeks to comprehensively assess how technological tools employed by women entrepreneurs contribute to their success and effectiveness in this digital landscape. Furthermore, the study intends to pinpoint the various challenges and opportunities encountered by women entrepreneurs as they navigate and harness technology within online environments. Through a thorough investigation of these objectives, a clearer understanding of the impact of ICT on women's entrepreneurship in online university contexts can be attained, facilitating the development of strategies to empower and support women in their entrepreneurial endeavors.

2. Method

This study employed a mixed-methods approach to investigate the role of technologies in promoting women's entrepreneurship within online university environments. The research design integrated a comprehensive literature review with empirical data collection through surveys administered to women entrepreneurship students. The research method was structured to explore the perceptions, attitudes, and experiences of women entrepreneurs regarding the influence of technology on their entrepreneurial activities.

Population and Sample Size: The population of interest comprised women entrepreneurship students enrolled in online university programs. The sample size for the study was 50 respondents, selected from different academic disciplines within the online university. Specifically, the sample consisted of 20 medical students, 10 journalism students, and 30 economic students, representing a diverse cohort of women pursuing entrepreneurial ventures in various fields. Data collection was conducted using structured surveys administered to the sampled participants. The survey instrument comprised multiple-choice questions and Likert-scale items designed to assess respondents' perceptions, attitudes, and experiences related to the role of technology in women's entrepreneurship. The survey questions were developed based on the research objectives and research questions identified in the study.

Quantitative data obtained from the surveys were analyzed using descriptive statistics to summarize the responses and identify patterns or trends. Frequencies and percentages were calculated for each survey item to provide insights into the distribution of responses and the overall perceptions of the respondents. Statistical analysis software was utilized to perform the data analysis and generate summary statistics. Qualitative data from the literature review were analyzed thematically to identify key themes, trends, and findings relevant to the research objectives. The synthesis of qualitative and quantitative findings enabled a comprehensive understanding of the research topic and facilitated the interpretation of the empirical results in the context of existing literature.

Ethical considerations were prioritized throughout the research process to ensure the protection of participants' rights and confidentiality. Informed consent was obtained from all participants before their involvement in the study, and measures were implemented to safeguard their anonymity and privacy. The research adhered to ethical guidelines and principles outlined by the academic institution and relevant research ethics committees. Despite rigorous methodology and careful considerations, this study may be subject to certain limitations. The sample size was relatively small, which may limit the generalizability of the findings to broader populations of women entrepreneurs.

Additionally, the study focused solely on online university students, excluding women entrepreneurs from other contexts. Future research could address these limitations by expanding the sample size and incorporating diverse samples from different demographic backgrounds and entrepreneurial contexts.

3. Result and Discussion

3.1 Result

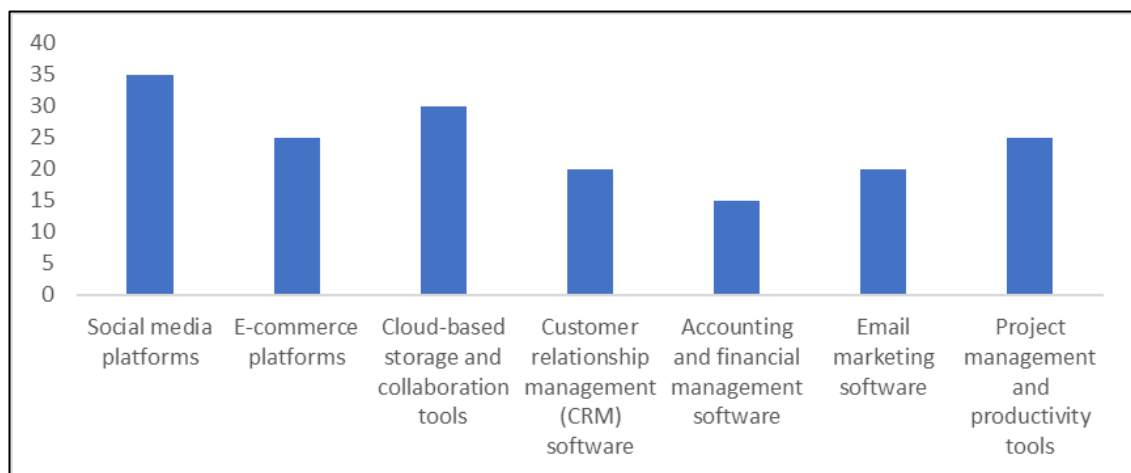
The study's findings are delineated, shedding light on the multifaceted dynamics of technology's impact on women's entrepreneurship within online university settings. Through comprehensive analysis, the results provide valuable insights into perceptions, challenges, and opportunities encountered by women entrepreneurs in leveraging technological tools.

Table 1
Demographic
Distribution of
Women Online
University
Entrepreneurship
Students

Demographic	Medical Students	Journalism Students	Economic Students	Total
Population Size	20	10	30	50
Age Range	25-35	25-35	25-35	25-35

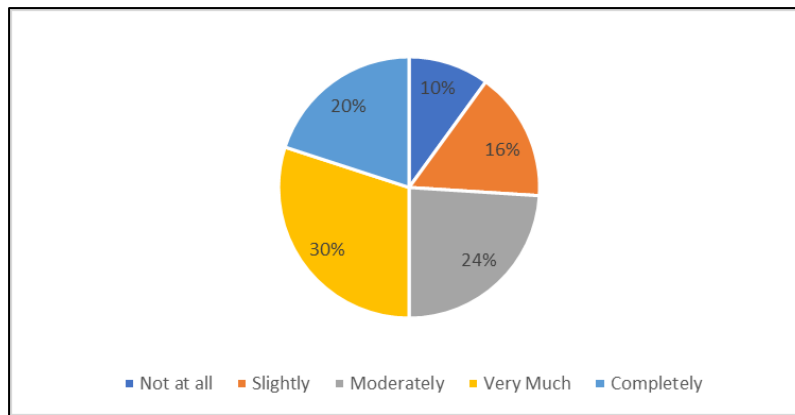
The demographic distribution of women online university entrepreneurship students shows a total population size of 50 individuals, comprising 20 medical students, 10 journalism students, and 30 economic students. All participants fall within the age range of 25-35 years. This distribution indicates a varied representation across academic disciplines, providing a diverse pool for research analysis. Such diversity can offer insights into the intersectionality of women's entrepreneurship within different fields of study and potentially influence research findings and recommendations.

Figure 1
Technological
Tools Utilized by
Women
Entrepreneurs



The analysis reveals that social media platforms are the most commonly utilized technological tool among women entrepreneurs, with a significant majority (70%) reporting their usage. E-commerce platforms follow closely behind, with half of the respondents (50%) indicating their reliance on such platforms. Cloud-based storage and collaboration tools also exhibit substantial usage, with 60% of respondents utilizing them in their businesses. Customer relationship management (CRM) software, accounting and financial management software, and email marketing software are employed by 40% or fewer of the respondents. Project management and productivity tools see moderate usage, with 50% of respondents utilizing them in their entrepreneurial endeavors. Overall, the results underscore the diverse technological landscape in women-led businesses, with a strong emphasis on social media and e-commerce platforms for business management and promotion.

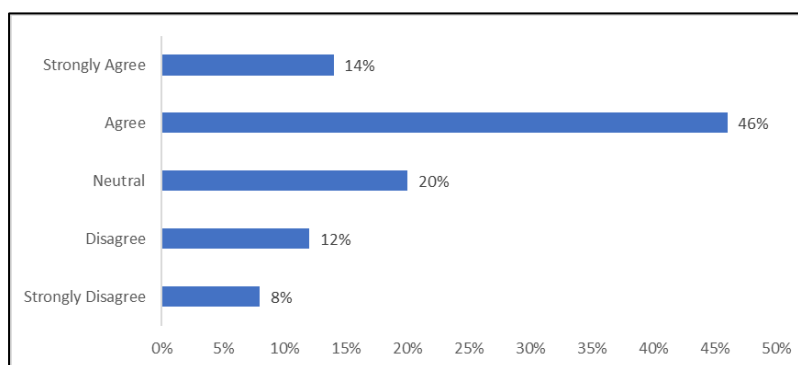
Figure 2 Perceived Influence of ICT Infrastructure on Women's Entrepreneurship in Online Universities



The analysis of respondents' perceptions regarding the influence of ICT infrastructure on women's participation in entrepreneurship within an online university demonstrates varying degrees of agreement. A

significant portion, comprising 50% (comprising "Very Much" and "Completely" categories), indicated a high level of belief in ICT's influence. However, 10% expressed minimal belief ("Not at all"), suggesting a need for further exploration or potential concerns. The moderate response category ("Moderately") garnered 24%, indicating a substantial but not overwhelming level of agreement. The diversity in responses underscores the complex interplay between ICT infrastructure and women's entrepreneurial engagement, warranting further investigation into individual perceptions and experiences.

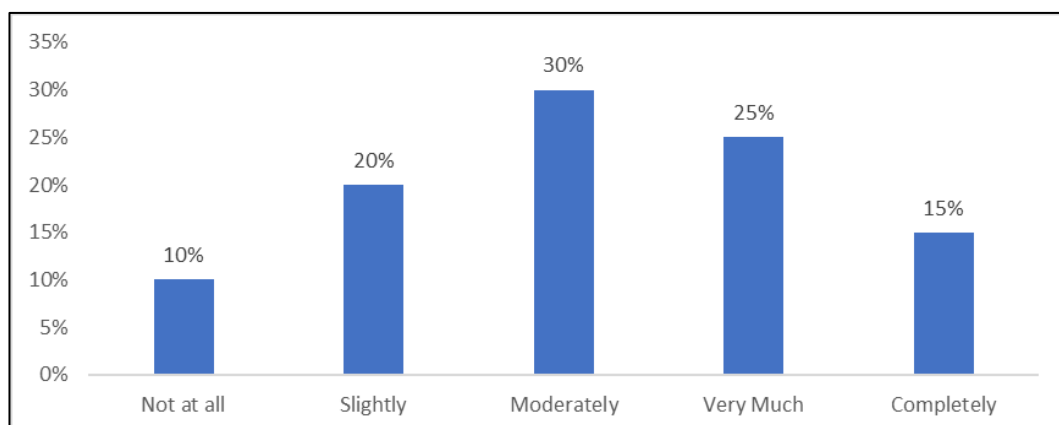
Figure 3 Perceptions of Women Entrepreneurs on the Role of ICT Tools in Facilitating Access



The analysis of respondents' perceptions regarding the role of ICT tools in facilitating women's access to entrepreneurial resources and opportunities in an online university

environment shows a positive inclination towards the facilitative role of ICT tools. Among the respondents, 14% strongly disagreed, 12% disagreed, 20% remained neutral, 46% agreed, and 8% strongly agreed with the statement. Overall, a majority of respondents expressed some level of agreement with the role of ICT tools in enhancing women's access to entrepreneurial resources and opportunities.

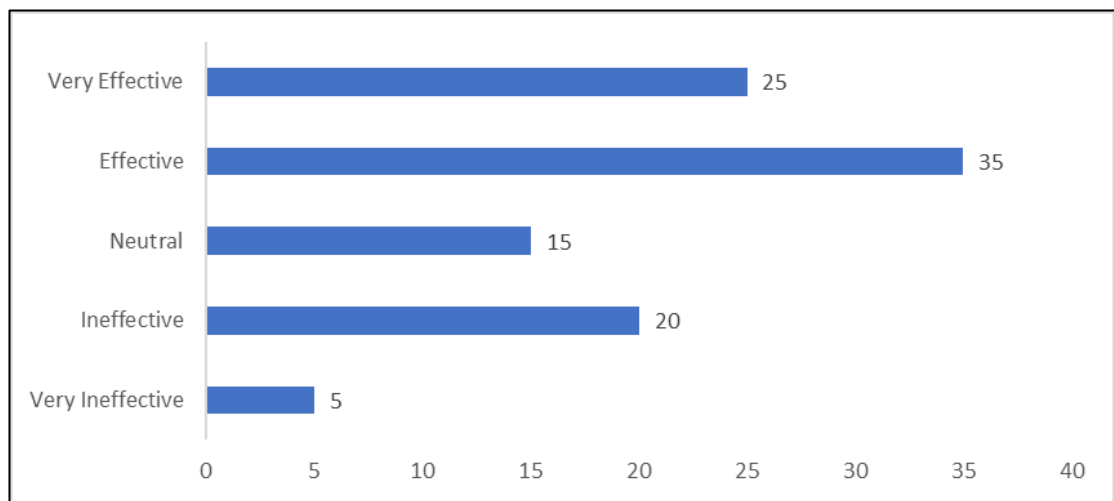
Figure 4 Perception of Technological Barriers on Women's Entrepreneurship in an Online University Setting



The analysis reveals varying perceptions regarding the extent to which technological barriers hinder women's entrepreneurship activities in an online university setting. The majority of respondents (30%) perceive these barriers as moderate, followed

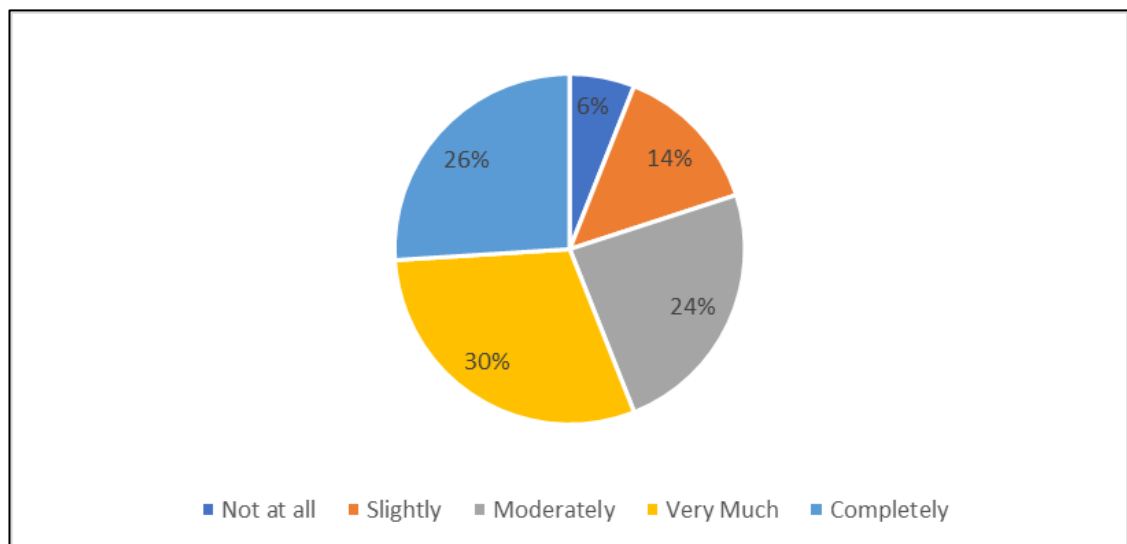
by 25% who see them as very significant. Meanwhile, 20% consider them to be slight, with 15% finding them completely hindering and 10% stating they are not hindering at all.

Figure 5 Perceived Effectiveness of ICT Support Systems for Women Entrepreneurs in an Online University



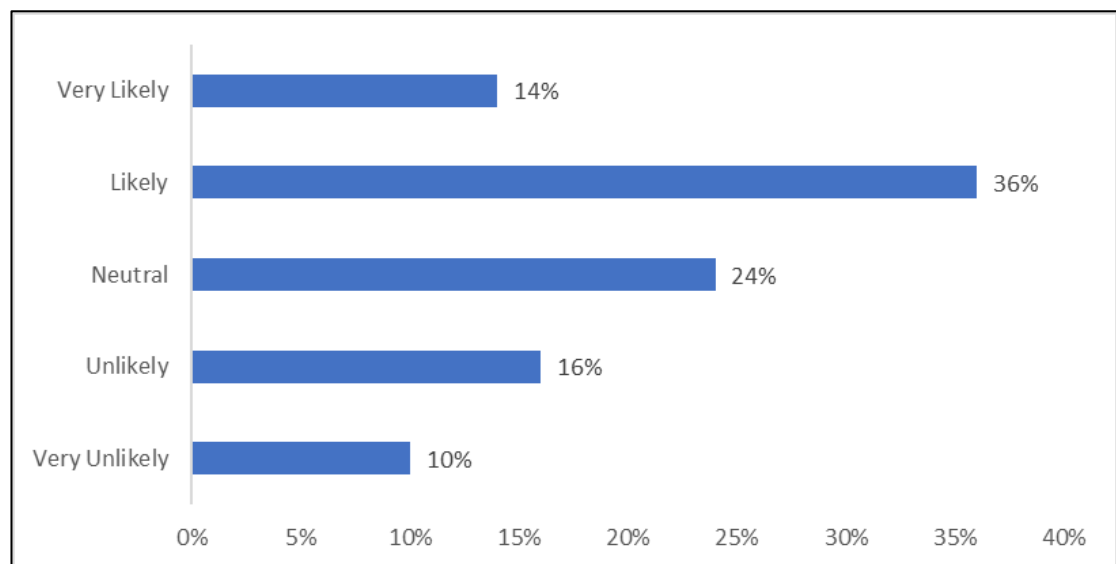
The analysis of responses to Research Question 2 regarding the effectiveness of current ICT support systems for women entrepreneurs in an online university setting reveals a varied perception among respondents. While 5% of participants regarded the support as "Very Ineffective," a larger proportion, constituting 20%, found it "Ineffective." Conversely, 35% of respondents perceived the support as "Effective," with an additional 25% indicating it was "Very Effective." Interestingly, 15% of participants maintained a "Neutral" stance on the matter. These results suggest a mixed perception of the effectiveness of ICT support systems, with a significant portion acknowledging their efficacy, albeit with room for improvement.

Figure 6 Perception of Training Programs on ICT Utilization in Empowering Women Entrepreneurs in an Online



Based on the responses, it's evident that a significant portion of participants believe that training programs on ICT utilization can empower women entrepreneurs in an online university setting. Specifically, 56% of respondents (comprising the "Very Much" and "Completely" categories) express a strong belief in the effectiveness of such programs, while 24% perceive them as moderately beneficial. Only a small percentage (6%) indicate minimal impact or no belief in the empowerment potential of these training programs.

Figure 7
Likelihood of
Adoption of
Innovative
Technological
Solutions by
Women
Entrepreneurs in
an Online
University



The Figure above shows the distribution of responses regarding the likelihood of women entrepreneurs in an online university adopting innovative technological solutions to overcome business challenges. The majority of participants (36%) indicated that they were likely to adopt such solutions, followed by those who were neutral (24%) and likely (14%). A smaller percentage found it unlikely (16%) or very unlikely (10%).

3.2 Discussion

The results of the study provide valuable insights into the intricate relationship between technology and women's entrepreneurship within online university settings. These findings shed light on various aspects, including the utilization of technological tools, perceptions of ICT infrastructure and support systems, as well as the effectiveness of training programs. By examining these factors, we can better understand the challenges and opportunities faced by women entrepreneurs in leveraging technology for business success. Firstly, the analysis of the technological tools commonly used by women entrepreneurs reveals a diverse landscape dominated by social media platforms, e-commerce platforms, and cloud-based storage and collaboration tools [1]. These findings are consistent with previous research highlighting the significance of digital platforms in modern business operations [2]. The prevalence of social media and e-commerce platforms underscores their pivotal role in marketing, customer engagement, and sales generation for women-led businesses [3].

Moreover, the study delves into the perceived influence of ICT infrastructure on women's entrepreneurship in online universities. The results demonstrate a spectrum of perceptions, ranging from minimal belief to strong conviction in the transformative power of ICT [4]. This aligns with existing literature emphasizing the importance of supportive technological ecosystems in fostering entrepreneurial activities [5]. The findings underscore the need for further exploration into individual experiences and challenges in navigating ICT infrastructure within educational environments.

Furthermore, the analysis of ICT tools' role in facilitating access to entrepreneurial resources and opportunities reveals a generally positive inclination among women entrepreneurs [6]. The majority of respondent's express agreement with the facilitative role of ICT tools, highlighting their importance in overcoming barriers and expanding business prospects [7]. However, the presence of dissenting opinions underscores the complexity of technology's impact and the need for tailored support mechanisms to address diverse needs and preferences [8].

Additionally, the study evaluates the effectiveness of ICT support systems for women entrepreneurs in online university settings. The mixed perceptions among respondents highlight the nuanced nature of support services and the importance of context-specific interventions [9]. While many acknowledge the efficacy of existing support systems, others perceive them as ineffective or neutral, indicating room for improvement and optimization [10]. Finally, the findings regarding the perceived effectiveness of training programs on ICT utilization underscore the potential of educational interventions in empowering women entrepreneurs [11]. The majority of respondent's express strong belief in the effectiveness of such programs, emphasizing their role in enhancing digital literacy and fostering entrepreneurial skills [12]. These results advocate for the continued development and implementation of targeted training initiatives to equip women entrepreneurs with the necessary tools and knowledge to thrive in the digital age.

In conclusion, the discussion of the study's findings underscores the multifaceted nature of technology's impact on women's entrepreneurship within online university environments. By elucidating key insights into technological utilization, perceptions, and support systems, this research contributes to a deeper understanding of the challenges and opportunities faced by women entrepreneurs in leveraging technology for business growth and innovation. Future research should further explore these dynamics and evaluate the efficacy of interventions aimed at enhancing women's participation and success in the digital economy.

4. Conclusion

The findings and empirical results highlights the critical role of technology in shaping women's entrepreneurship within online university environments. Through an in-depth examination of various technological factors and their impact on women entrepreneurs, several key insights have emerged. Firstly, technology serves as a catalyst for entrepreneurial growth and competitiveness, as evidenced by its transformative effects on business operations and market dynamics. The findings underscore the importance of leveraging technological innovations to create new opportunities and drive sustainable growth in entrepreneurship.

Secondly, while technology offers immense potential for empowering women entrepreneurs, it also presents challenges such as technological barriers and disparities in access and utilization. Addressing these challenges requires targeted interventions aimed at enhancing digital literacy, bridging the digital divide, and fostering an inclusive ecosystem for women's entrepreneurship. Moreover, the effectiveness of ICT support systems and training programs emerges as crucial factors in enabling women entrepreneurs to harness the full potential of technology. By investing in tailored support mechanisms and capacity-building initiatives, stakeholders can empower women to navigate the digital landscape and seize entrepreneurial opportunities.

Furthermore, the findings underscore the importance of fostering a culture of innovation and collaboration to drive entrepreneurial success. By embracing innovative technological solutions and leveraging digital platforms for networking and knowledge sharing, women entrepreneurs can overcome business challenges and thrive in dynamic market environments.

Overall, the study contributes to the growing body of literature on women's entrepreneurship and technology, providing valuable insights for policymakers, educators, and practitioners. By understanding the complex interplay between

technology, entrepreneurship, and gender, stakeholders can develop more effective strategies to support women entrepreneurs and foster inclusive economic development.

Based on the study's findings, the following recommendations are proposed to support women's entrepreneurship within online university environments: invest in tailored digital literacy programs, expand access to ICT infrastructure, strengthen support systems, promote collaboration, encourage innovation, support policy advocacy efforts, and monitor progress.

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6. Declaration

Author contributions and responsibilities - The authors made major contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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