

Exploring the interplay between female entrepreneurship and marriage: Insights through bibliometric analysis

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Abstract: This study utilizes a bibliometric analysis to examine the intersection of marriage and female entrepreneurship and identify five key themes: the gender gap in entrepreneurship, rural women entrepreneurship, female entrepreneurial concerns, entrepreneurship-family structure, and cultural problems of women entrepreneurs. Conducting a strategic diagram shows that the “entrepreneurship-family structure” is extensively developed and central, while the “gender gap in entrepreneurship” and “female’s entrepreneurial concerns” show no internal development but provide foundational knowledge for the other themes. Conversely, “rural women’s entrepreneurship” and “cultural problems of women’s entrepreneurs” are well developed in theory but lack practical application in all topics. Additionally, the study proposes a conceptual framework that illustrates how work-family conflict and role ambiguity influence the gender gap in entrepreneurship. Applying the developed framework helps reduce the gender gap in entrepreneurship.

Keywords: *Bibliometric analysis, Female entrepreneurship, Gender gap, Marriage, Role ambiguity, Work-family conflicts.*

1. Introduction

Despite the progress in women’s educational attainment and employment, there is still a gender gap in entrepreneurship due to discriminatory practices and deep-rooted cultural norms (Avnimelech & Zelekha, 2023). For example, women-owned businesses receive only three percent of venture capital investments, and female entrepreneurs are 63% less likely to receive venture capital funding than their male counterparts (Snellman & Solal, 2022). Although there is a gender gap in entrepreneurship, there is evidence to suggest that women’s entrepreneurial endeavors have similar success rates to men’s (e.g., Rosado-Cubero et al., 2024). Thus, ignoring women entrepreneurs deprives society of an enormous pool of human resources that could be used to support successful entrepreneurial endeavors. Understanding the factors that influence women’s contribution to entrepreneurial activities can help decision-makers and politicians pave the way for the presence of female entrepreneurs. Notably, marriage emerges as a significant factor shaping women’s entrepreneurial path (e.g., Efobi et al., 2021; Mushonga & Dzingirai, 2021). This is why we are concentrating on the role of marriage in female entrepreneurship in our current study.

Marriage impacts women’s involvement in entrepreneurship, bringing a level of understanding to the relationship between marriage and women’s business ventures. While it can improve a family’s situation, it often leads to a decrease in women’s personal earnings, as pointed out by Marshall & Flaig, (2014). This is mainly because marriage increases the time women spend on household duties, reducing their availability for pursuits. In Nepal, societal changes have expanded women’s workforce participation. At the time have raised employment obstacles. Henry and Lewis (2023) emphasized that marriage plays an influential role in women’s opportunities and social status but also creates reliance on their spouse for financial support. In a study by Hsu et al. (2019), it was noted that married women who are entrepreneurs often feel more regret about choosing entrepreneurship compared to their unmarried counterparts. However, this does not apply universally. Research conducted by Lieshout et al. (2019)

revealed that marriage and motherhood despite leading to participation in the workforce can actually spur women to solid endeavor. They observed a significant increase in the relationship between entrepreneurship and the number of children a female entrepreneur has. Indeed, while marriage may present challenges, it can act as a driving force for women to pursue careers. It is essential to pay attention to the relationship between marriage and women's entrepreneurship and provide an overview of this field so stakeholders can comprehensively understand the issue.

In order to increase knowledge about women's entrepreneurship and their marital status, this study conducts a bibliometric analysis to strengthen knowledge about women's entrepreneurship and marital status. It also provides a data-oriented framework for future research, which is helpful for enriching researchers' decision-making to fill the scientific gaps in the field. Bibliometric analysis provides a macro-level picture of the field of study instead of focusing on a small subset of findings and also allows academics and professionals to understand the overall structure and trends in a field (Baziyad et al., 2024). The current paper aims to respond the following research questions: (a) What are the key research areas and recent breakthroughs at the nexus of marriage and female entrepreneurship? (b) How did the disclosed themes develop theoretically, and how could they contribute to each other to fill the potential gaps? (c) How are the work-family conflicts and role ambiguity related to the entrepreneurship gender gap?

2. Literature Review

The exploration of women's entrepreneurship has unfolded through a series of scholarly inquiries, each building upon the last to form a comprehensive understanding of the field. There are several academic studies on women's entrepreneurship, each of which builds on the previous one to provide an understanding of the subject. A number of scholars have conducted comprehensive analyses of the field of women's entrepreneurship. Santos et al. (2018) laid the groundwork with a bibliometric analysis that organized the burgeoning literature from 1976 to 2016 and identified key themes and challenges in the field. Similarly, Deng et al. (2021) analyzed the intellectual structure of the field in a bit broader timespan (i.e., from 1975 to 2018). However, other studies have narrowed their focus to specific aspects within the context of women's entrepreneurship. For instance, the concept of internationalization is a popular topic in bibliometric analyses of entrepreneurship (Baier-Fuentes et al., 2019), and women entrepreneurship researchers have been interested in it. Moreira et al. (2019) focused on the role of women in business internationalization and found thematic clusters that would inform policy and future research. Anggadwita & Indarti (2023) analyzed SME internationalization and proposed a conceptual model for future studies. Sustainability was another field that entrepreneurship researchers have tried to understand through bibliometric analysis (Anand et al., 2021). For example, Raman et al. (2022) looked into the evolution of women's entrepreneurship in the era of Sustainable Development Goals under the impact of COVID-19 on women's empowerment. Digitalization and gender equality were the other areas bibliometric studies focused on in the context of women's entrepreneurship. Rando-Cueto et al. (2022) linked communication advancements with the digitization process in women-led businesses and emphasized the need for communication training. Beloskar et al. (2024) analyzed gender equality and women's empowerment in the context of management through identifying involved topics.

Besides excluding certain domains, some researchers have done bibliometric analysis on specific geographic regions. Mushonga & Dzingirai (2021) looked at 'marriages of convenience' in the realm of African migration and provided insights on how marriage is used for business integration by Nigerian entrepreneurs in Zimbabwe. Kato (2023) on microfinance, identified barriers to access for women led businesses while Baral et al. (2023) reviewed Indian women entrepreneurs and noted the scarcity of studies on motivational factors and performance metrics. Jiang et al. (2024) employed a bibliometric analysis to investigate Chinese women entrepreneurs and proposed a research agenda that includes the impact of generative AI. Corrêa et al. (2024) categorized the challenges of women's entrepreneurship in emerging economies and suggested areas for future research to inform policy and practice. Table 1 shows the focus of previous bibliometric studies and current research in entrepreneurship.

Table 1.
Comparative analysis of bibliometric studies.

Authors, year	The current's paper scopes			Alternative areas explored in previous research	Geographical concentration
	Women	Entrepreneurship	Marriage		
Santos et al., (2018)	✓	✓		-	No geographic restrictions
Moreira et al., (2019)	✓	✓		Internationalization	No geographic restrictions
Vallaster et al., (2019)		✓		Ethics	No geographic restrictions
Baier- Fuentes et al., (2019)		✓		Internationalization	No geographic restrictions
Deng et al., (2021)	✓	✓		-	No geographic restrictions
(Anand et al., 2021)		✓		Sustainability	No geographic restrictions
Xu et al., (2021)		✓		Crisis	No geographic restrictions
Raman et al., (2022)	✓	✓		Sustainable development	No geographic restrictions
Rando- Cueto et al., (2022)	✓	✓		Communication	No geographic restrictions
Kato (2023)	✓	✓		Microfinance solutions	No geographic restrictions
Anggadwita & Indarti (2023)	✓	✓		Internationalization of SMEs	No geographic restrictions
Baral et al., (2023)	✓	✓		-	India
Jiang et al., (2024)	✓	✓		-	China
Beloskar et al., (2024)	✓	✓		Gender equality	No geographic restrictions
Corrêa et al., (2024)	✓	✓		-	Emerging and developing countries
The current study	✓	✓	✓	-	No geographic restrictions

According to Table 1, previous bibliometric analysis did not explore the niche where a few researchers have examined the intersection of entrepreneurship and marriage. While Mushonga & Dzingirai (2021) touched upon the strategic use of marriage for business purposes, there is a lack of comprehensive bibliometric studies that specifically investigate how marriage intersects with women's entrepreneurship. Thus, this paper conducts a bibliometric analysis to fill this gap.

Table 1 shows that in previous bibliometric analysis, there is no field in which the number of academics deal with the relationship between marriage and entrepreneurship. Bao (2024) found consistent evidence of a reduced gender gap in STEM (Science, Technology, Engineering, and

Mathematics) entrepreneurship. Surprisingly, the effects were driven by an increase in STEM entrepreneurship among married women who founded unincorporated businesses. Comprehensive bibliographic research that specifically addresses the relationship between marriage and women's entrepreneurship is hard to come by. To solve this gap, a bibliometric study is conducted in the current study. So that by focusing more on the intersection, a more complete understanding of women entrepreneurs can be created and more practical solutions to support them can be provided. Finally, according to the relationships between the disclosed topics obtained from the bibliometric analysis, we design a conceptual framework to show how the researchers studied the disclosed themes alongside each other.

3. Methodology

Bibliometric analysis utilizes mathematical and statistical methods to analyze written content and scholarly works. It's fundamentally a quantitative technique that identifies dominant trends in a specific area of research. Text mining is particularly notable in bibliometrics for its capacity to extract hidden insights from academic papers. Additionally, co-word analysis, which falls under text mining, has been successfully applied in bibliometric research to outline the intellectual landscape of different fields (Baziyad et al., 2024). Co-word analysis quantitatively uncovers the relationships and dynamics between concepts in a discipline. It employs a graph-based approach to break down a network of co-occurring words into themes and subgraphs, charting the varied segments within the research area being examined (Pourhatami et al., 2021). In the current paper, a co-word analysis is conducted first to identify the field's themes involved. Then, a strategic diagram analysis is employed to determine the status of the disclosed themes from the context of theoretical development and applications. Then, a co-theme network of the theme is depicted to show how the themes relate. Finally, a conceptual framework is designed based on the strongest connections of the co-theme network. The overall methodological processes are shown in Figure 1.

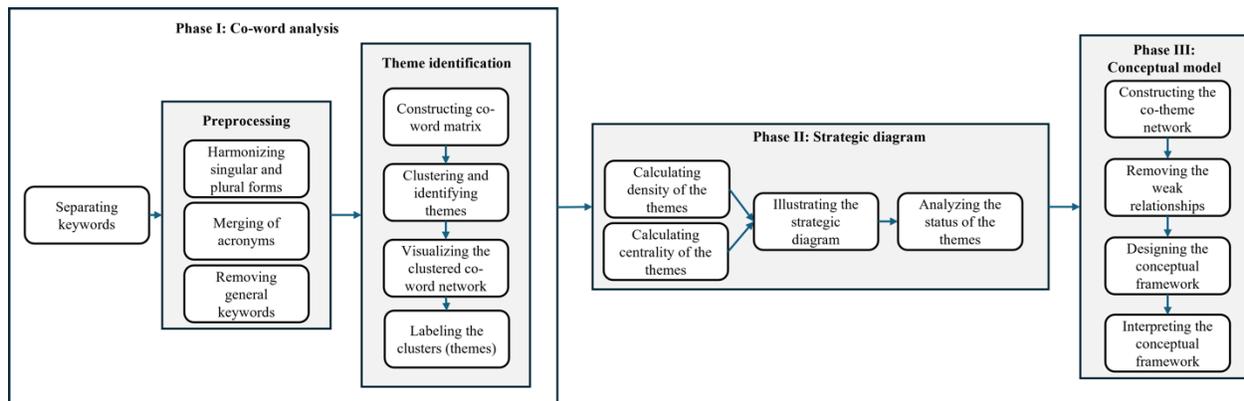


Figure 1.
Methodology process of the research.

3.1. Data Collection

To gather the necessary data, we retrieved the relevant publications by executing the following search query within the Scopus academic database: TITLE-ABS-KEY (*female OR wom?n) AND TITLE-ABS-KEY (entrepreneur*) AND TITLE-ABS-KEY (marriage OR married) AND (LIMIT-TO (LANGUAGE , "English")).

The query is structured to find scholarly articles that discuss female entrepreneurship in the context of marriage, with all content being in English. The use of the TITLE-ABS-KEY field ensures that the search is comprehensive across titles, abstracts, and keywords. The query is likely aimed at researchers interested in the intersection of female, entrepreneurship, and marital status. The number of publications per year is depicted in Fig. 2. Initially, a total of 227 publications were gathered. Upon

filtering to exclude irrelevant articles and those lacking author keywords, we narrowed the selection down to 158 publications for analysis.

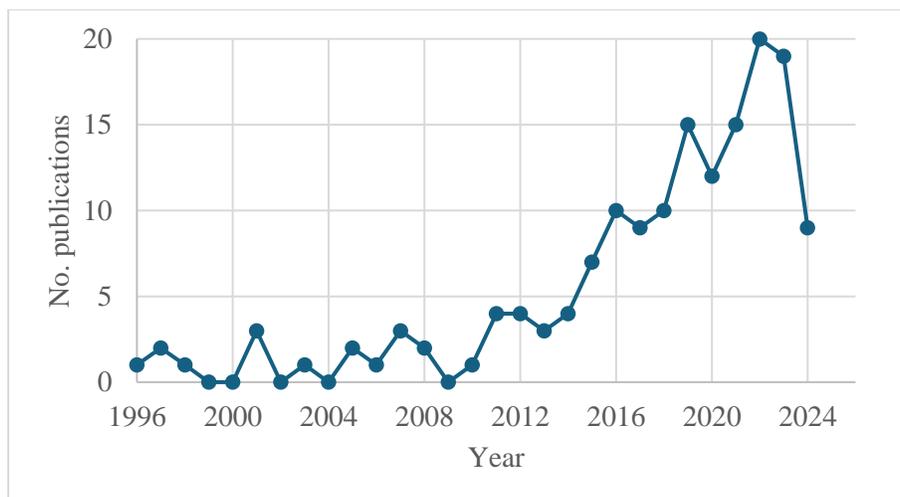


Figure 1.
Number of publications until 2024.

The data provided outlines the number of publications in the field of women's entrepreneurship and marriage from 1996 to May 2024. Here's a description of the publication trends over these years:

- **Initial Activity (1996-2005):** The first three papers were published in 1996 and 1997. Additionally, it has been observed that in certain years, no publication of either of them occurred such as, 1999 or 2000, which could show that this is still in the early stage of trending.
- **Gradual Increase (2006-2014):** Starting from 2006, annual publication totals ranging between one and three rather insignificant yearly rise in the number of publications. This leads to more academic research interests, though they are still restricted, concentrating on 'woman entrepreneur and marriage'.
- **Notable Growth (2015-2023):** An increase in the number of publications was observed starting from the year 2015 to the year 2022. This could be a different perspective on gender and entrepreneurship posited as an increased consciousness.
- **Recent Data (2024):** Nine publications were seen for the first five months of this calendar, which, if the trend continues, could project an increasing annual total number of publications

Overall, the data reflects an increasing scholarly attention to the topic over the past three decades, with particular interest surging in the last decade. The reasons behind this growth could be multifaceted, including societal shifts, policy changes, and a broader understanding of the role of gender in business dynamics. The data also suggests that the field is becoming more established and recognized within the academic community.

The trend values signify a gradual but consistent growth in the number of scholarly publications focusing on the concept under research within the last three decades; however, the trend is evident within the last decade. There could be many well-thought-out reasons for this growth, including changes in society and policies concerning both men and women in business. The data also points out that the advancements in the proposed field have also been witnessed in its recognition within the academic environment.

3.2. Data Preprocessing

We initially isolated keywords from the dataset. Subsequently, these keywords undergo a filtration process based on several factors: firstly, the harmonization of keyword variants in terms of singular and

plural forms (for instance, "family" and "families"); secondly, the merging of acronyms with their full forms (like "Small and Medium-Sized Enterprises" with "SMEs"); and thirdly, the removal of broad or non-specific keywords (such as "algorithm").

3.3. Co-Word Network Construction

The co-occurrence matrix is indeed a pivotal element in co-word analysis, capturing the frequency at which keywords appear together. To construct this matrix, one must first identify all unique keywords within the scope of the study. Each keyword is then assigned to a matrix row and column, creating a two-dimensional array where each cell represents the potential intersection between two keywords. Once the co-occurrence matrix is constructed, it is transformed into a co-word graph. This graph is a visual representation of the matrix, where keywords are depicted as nodes, and the frequency of their co-occurrence is represented by the weight of the edges connecting them. The steps to create a co-word graph are as follows (Baziyad, Norouzi, et al., 2020; Hosseini et al., 2021)

- Node Creation: Each keyword becomes a node in the graph.
- Edge Creation: An edge is drawn between two nodes if the corresponding keywords co-occur in the matrix.
- Weight Assignment: The weight of each edge is determined by the frequency of co-occurrence, with higher weights indicating stronger associations.

A co-occurrence matrix is a critical part of co-word analysis because it holds the frequencies that the keywords occur in combination. Each keyword corresponds with the matrix row and column; hence, they are developed to form a two-dimensional structure, where each structure element forms the potential of two keyword interrelationships. Subsequently, the co-occurrence matrix is converted into what is referred to as the co-word graph. This image illustrates the matrix with words as a node inside the graph, and the weight between the nodes shows the frequency of the keywords being used in the same context. The suggested steps for constructing a co-word graph are as follows (Baziyad, Norouzi, et al., 2020; Hosseini et al., 2021):

- Node Creation: In our graph, each keyword acts as a node in the graph.
- Edge Creation: If two nodes connect, the matrix contains overlapping keywords between those specific nodes.

Weight Assignment: Every edge has a weight depending on how often it co-occurs with the other, with more frequent co-occurrences being denoted by a higher weight.

We used Gephi 0.9.7 To visualize the co-word network.

3.4. Content Analysis

A community detection algorithm is used to determine popular topics in a specific research area. In addition, a strategic diagram is used to evaluate and compare the status of each of the themes to other themes. Combining co-word analysis with strategic diagrams enriches the bibliometric assessment by providing different layers of view and a more efficient way of understanding and navigating the complex structure of academic research, which is rather beneficial and informative for both studying the developments and organizing research (Baziyad et al., 2024; Baziyad, Shirazi, et al., 2020).

3.5. Community Detection

Clustering techniques are traditional machine-learning methods. To establish co-word communities within the network configuration, this study uses the Louvain algorithm (Blondel et al., 2008), which is one of the most applied community detection algorithms available in co-word analysis studies (e.g., Baziyad et al., 2024). The modularity criterion quantifies the quality of disclosed communities and determines the efficiency of the community detection algorithm utilized. The higher modularity values indicate that the identified themes are most probably dissimilar to those of other communities, and most elements within the same community area are relatively more similar than others. (Newman, 2004). The equation for modularity is detailed in Eq. (1) (Newman, 2004).

$$Q = \frac{1}{4} \sum_{ij} \left(A_{ij} - \frac{k_i k_j}{2m} \right) s_i s_j; m = \frac{1}{2} \sum_i k_i \quad (1)$$

where k_i and k_j represent the node's degree and m indicates a total number of edges. A_{ij} introduces presented edges between node i and j . Also, the expected number of edges between nodes and can be calculated as $\frac{k_i k_j}{2m}$.

3.5.1. Strategic Diagram

A strategic diagram organizes scientific clusters within a bidimensional framework, assessing their development stage. This diagram is characterized by two primary metrics: density and centrality (also known as degree centrality). Density serves as a reliable measure for evaluating the internal unity of a theme, while centrality indicates the potential influence of a theme within the broader research landscape. These metrics are calculated by Equation (2) and Equation (3).

$$C_L = \sum_{i \in L} \sum_{j \in M} W_{ij} \cdot e_{ij} \quad (2)$$

In Equation (2), the term C_L represents the centrality measure for the community, denoted by L , with i being the identifier for individual nodes (words) within that community. The symbol M stands for all other communities apart from L , and j identifies the nodes present in these other communities. The binary variable e_{ij} signifies whether a connection between nodes i and j is present or absent. Lastly, W_{ij} denotes the strength of the existing connection between nodes i and j .

$$D_L = \frac{2E}{N(N-1)} \quad (3)$$

where D_L is defined as the density metric for the cluster labeled L . The variable E stands for the aggregate count of edges within the specified theme L , and N corresponds to the complete count of nodes that constitute cluster L . The strategic diagram framework is structured into four principal quadrants, each delineated by the assessed values of density and centrality measures. This configuration is visually represented in Fig. 3.

Density	<p>Quadrant II: Developed but isolated themes (Ivory Tower)</p> <p>The clusters, while in proximity to one another, each focus on a distinct theme. Within this space, we observe niche themes that either form independent subfields or represent external concepts borrowed from various disciplines, all of which are undergoing novel advancements within the field under study.</p>	<p>Quadrant I: Motor themes (Mainstream)</p> <p>In this area, we identify the core themes characterized by tightly-knit clusters with a high density of interconnected keywords, indicating strong associations. Additionally, the high centrality of these themes suggests they serve as pivotal links to numerous related topics.</p>
	<p>As these themes progress, they are likely to move towards a position of increased centrality, becoming more integral to the field. Simultaneously, as they rise, they will accumulate density, reflecting a growing aggregation of related ideas. This dynamic progression may well lay the groundwork for novel trends and advancements within the discipline.</p> <p>Quadrant III: Emerging or declining themes (Chaos/Unstructured)</p>	<p>The clusters are interconnected through a wealth of keywords, indicating high centrality, yet they remain distinctly unique, evidenced by their low density.</p> <p>Quadrant IV: Basic and transversal themes (Bandwagon)</p>
	Centrality	

Figure 3.
A strategic diagram conceptualization (Baziyad et al., 2024).

4. Results

After constructing the co-word network and implementing the community detection, five main themes are disclosed which are shown in separate colors in Fig. 4, namely female self-employment, rural women entrepreneurship, work–family conflict, role ambiguity, women's empowerment.

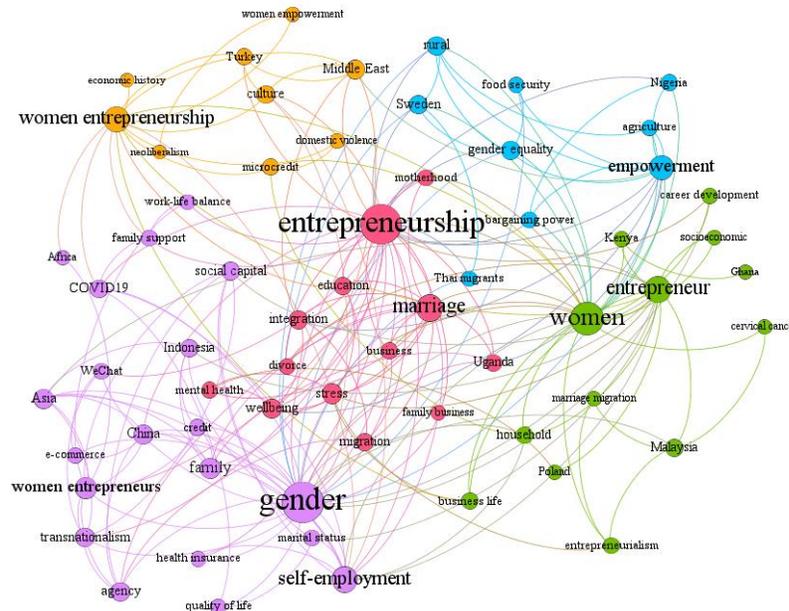


Figure 2.
Co-word network and involved themes.

4.1. Identified Themes

4.1.1. Cluster 1: Gender Gap in Entrepreneurship (C1: Purple Cluster)

This theme explains the relationship between gender and entrepreneurship, focusing on Asian women entrepreneurs, especially from China and Indonesia. This part discusses the challenges faced by women who work for themselves, especially in international businesses. Several variables that affect the entrepreneurial life of women are covered in this topic. According to the conducted research, these factors are either supporting or disruptive. Responsibilities, family characteristics, and family norms are some of the disruptive factors that increase the entrepreneurial gender gap. In contrast, family support, health insurance, and e-commerce help to fill the gap.

Family can either increase or decrease the gender gap in entrepreneurship. Yeoh & Willis (2005) highlighted the gender gap in transnational migration, showing that "elite" women are often sidelined. They indicated that many such women sacrifice their careers for family roles when moving to China, while those pursuing entrepreneurship face difficulties balancing work and family. Another research conducted by Zhang and Pan (2012) indicated that, in urban China's past, family characteristics created a gender gap in self-employment. Indeed, married women faced greater lay-off risks and were often pushed into unskilled self-employment, while men benefited from patriarchal traditions, leading to higher entrepreneurial activity. Due to family responsibilities, educated married women were still restricted from self-employment to state-sector occupations (Zhang & Pan, 2012). Seng (2018) discovered that the Dutch implementation of Confucian family law in colonial Indonesia undermined the independence of Indonesian-Chinese women, especially in the areas of credit and entrepreneurship, hence strengthening patriarchal standards and exacerbating the gender disparity in these domains.

Additionally, families have the power to significantly close the gender gap, especially in entrepreneurship. While family support increases a person's likelihood of owning a business, Guo & Werner (2016) found that the effect of family support is greater for women.

The gender gap is not only affected by the family, but also health can increase or decrease it. The gender gap is not only affected by the family, but also health can increase or decrease it. In their research, they concluded that the lives of female entrepreneurs are more affected in terms of mental health compared to the lives of male entrepreneurs. In addition, married entrepreneurs have more challenges compared to single entrepreneurs. According to Blume-Kohout (2023), the addition of health insurance by the employer has a significantly positive effect on reducing costs related to changing jobs. Additionally, she said, the increase in the percentage of self-employed single women can be attributed to the availability of non-employer health insurance. In the same way, Bao (2024) found in his research that the effectiveness of health insurance has a positive effect on reducing the gender gap in science, technology, engineering, and mathematics entrepreneurship. E-commerce is also one of the influential factors in reducing the gender gap in entrepreneurship. Liu (2020) clarified how e-commerce could degrade the prevailing gender norms favoring male marriage dominance. She underscored the contrast between private and public behaviors of couples, revealing that joint business efforts could undermine the traditional male authority norm while not significantly altering the female domestic role. Zani (2018) highlighted that WeChat served as a transformative platform for Chinese migrant women in Taiwan, proving helpful in bridging the gender gap by transforming their survival strategies and resistance into thriving business opportunities that contribute to a more equitable global economy. Figure 5 illustrates the organizational framework of publications associated with Cluster 1.

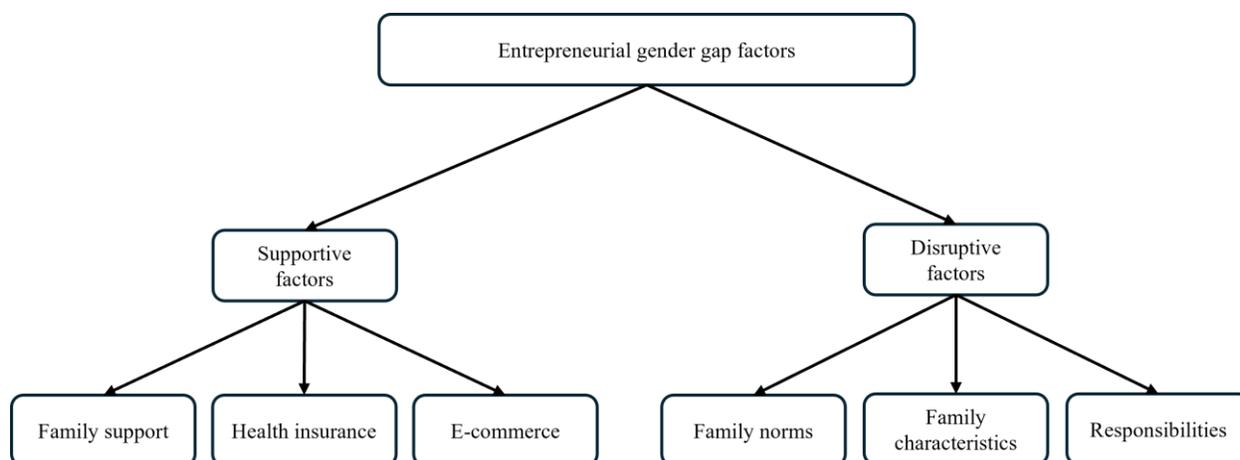


Figure 3.
Gender gap in entrepreneurship.

4.1.2. Cluster 2: Rural Women Entrepreneurship (C2: Blue cluster)

This cluster has investigated agricultural communities and empowering rural women entrepreneurs through increasing agricultural growth. Increasing gender equality and strengthening bargaining power empower rural women entrepreneurs. Among the factors that empower rural women are government support, technology, men's reliance on women's participation, and postponing marriage. These things help their negotiation power and maintain their position in rural areas. By bringing up examples of Swedish, Nigerian, and Thai rural women, we can highlight the vital role of female entrepreneurs in the villages.

Efobi et al. (2021) used an instrumental variable estimation technique in Nigeria's urban and rural communities, which was used for the Demographic and Health Survey from 2008 to 2013. This study showed that the chances of women who married later for entrepreneurship increased by 5%. Every year

of age added to later marriage can increase the chance of entrepreneurship by 12%. The results of this study showed that later marriage leads to better educational prospects, more negotiation leverage in marriage, and lower fertility, all of which support entrepreneurship. In some cases, it has been observed that marriage empowers men financially, but it does not apply to women. For instance, Tillmar et al. (2022) shed light on the gender-specific income differences in rural entrepreneurship within advanced welfare states. They investigated the impact of women's entrepreneurship on rural economic health and gender equality in Sweden. The outputs showed that while women's rural businesses are crucial for the local economy and are comparable in size to men's, women earn less due to various business and industry factors. Marriage boosts men's earnings but not women's. Despite claims that marriage can undermine women's empowerment, some researchers have found that it can have positive effects. Tillmar et al. (2022), for example, investigated the difference in income between female and male entrepreneurs in rural Sweden. They concluded that although women entrepreneurs' companies are as important as their male counterparts in running businesses in those areas and are vital to the local economy, their income is lower. Also, in rural companies in Sweden, men's salaries increase with marriage, but women's wages do not increase. Some academics claim that marriage can positively empower women despite the negative perceptions. Woldegies (2016) believed that, due to the crucial role of women in managing food insecurity and poverty, marriage positively influences the empowerment of women in rural areas. Making trans-local connections is another factor empowering women's entrepreneurship. Webster (2017) discussed the increasing presence of Thai migrant women in rural Sweden, who, through transnational marriages, establish businesses and lives while maintaining connections with their home regions. The research data was collected from interviews with 11 rural Thai females. The purpose of the research was to increase communication among rural communities. The result was that these women established their relationships through family, friends, business, social participation, and trans-local relationships. Through these relationships, they actively participated in Swedish and Thai rural communities. These activities were deeply rooted in the rural traditions and relationships they had before migrating. The research underscored the vital role of rural networks in enabling women to maintain trans-local business practices influenced by local and global gendered norms. ICT, or information and communication technology, can help women strengthen trans-local relationships. Tijjani et al. (2017) examined how ICT empowers women farmers in rural areas. They found that ICTs such as radios and cell phones are essential for gaining access to information and enhancing their enterprises. Despite the problems these women entrepreneurs had, they managed to form a network and expand and improve their poor social status. The barriers to establishing communication were the lack of expertise and access to electricity and ICT. Based on this study, it is recommended that additional government assistance in welfare facilities be provided to increase women's sense of empowerment. The organizational structure of papers related to cluster 2 is shown in Figure 6.

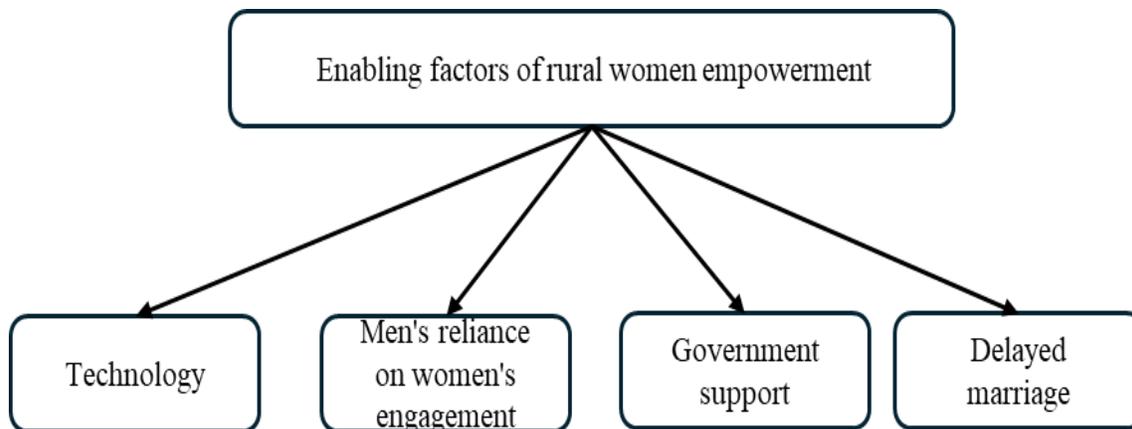


Figure 4.
Rural women entrepreneurship.

4.1.3. Cluster 3: Women's Entrepreneurial Concerns (C3: Green Cluster)

This cluster deals with the issue that women entrepreneurs must maintain a delicate balance between running a business and personal life, which is often disrupted by housework or health problems such as cervical cancer. Marriage migration is considered a phenomenon that involves many legal and cultural complications. A study by Ufuk and Özgen (2001) was conducted in Ankara among 220 married women entrepreneurs. They evaluated these women's business goals, types, risks, obstacles, income, personal characteristics, and future ambitions. They looked for profiles of these married women entrepreneurs. Their research also looked at how they followed the rules, whether these women were interested in education despite being married, and how their age, education, and experience affected their business transactions. The result was that among these women, meeting the family's requirements is one of the main drivers of entrepreneurship. Satisfying these demands is correlated with women's marital status and health. This interconnection has compelled researchers to concentrate their efforts on these specific domains. The health status of women entrepreneurs, particularly concerning cervical cancer, exerts a substantial influence on their business endeavors.

Kim & Ling (2001) examined the work-family conflicts that married women entrepreneurs in Singapore encounter. The research underscored their battles against societal norms of motherhood and household responsibilities, which clash with their entrepreneurial activities. From a survey of 102 women, the study pinpointed job-spouse, job-parent, and job-homemaker conflicts. The results indicated a pressing need for increased spousal support, flexible work options, and extended school hours to alleviate these conflicts and enhance the welfare of women entrepreneurs. Wu (2022) investigated the experiences of Vietnamese women in Taiwan who have been part of arranged marriages since the 1990s and have joined the workforce to provide for their families. Interviews with 13 women revealed their strategies for managing micro-entrepreneurship while juggling familial obligations and their own professional goals. In their study, Schmitt-Rodermund et al. (2019) concluded that entrepreneurial interests and talents among women can be predicted from their initial personality traits and the conditions in which they grew up. These components were associated with their entry into entrepreneurship in their late twenties. Also, it was found that divorced women tended to become entrepreneurs. Factors such as the background factors of the time period and individual life experiences significantly impacted how they became entrepreneurs. Christie and Gauvreau (2023) also concluded that married women participated actively in the economy. These married women could reject the notion that widows, and single women could only be successful entrepreneurs by using the family structure and creating a double income during the colonial economy. Tundui and Tundui (2024) investigated the complex relationships between microcredit, marital status, household economic status, and their combined effects on the performance of women entrepreneurs. They investigated these relationships

using survey data and statistical modeling. They concluded that marriage may have a destructive impact on female entrepreneurs' entrepreneurial performance, and the reason for this is that married women have more duties in family matters. In Southeast Asia, Chikh-Amnache and Mekhzoumi (2024) examined how changes in the world affected women who started businesses. Between 1980 and 1990, they looked for critical socio-economic factors that affect women's entrepreneurial performance. They concluded that assets, compensation, working conditions, mobility, and capacity to sign contracts positively affect women's performance. Conversely, equal property rights, unemployment, child-rearing, school attendance, and marriage have had negative effects.

One factor affecting women entrepreneurs' performance is their health status. Cervical cancer is one of the most common diseases among women. Norkhafizah Saddki and Norehan Mokhtar (2019) investigated the level of awareness and measures related to uterine cancer and the level of performing Pap smear tests among female entrepreneurs in Kedah, Malaysia. As a result of the research, it was found that the knowledge of these women about the symptoms of cervical cancer is very little, and they do not know the right time for a Pap smear test. Also, very few of them have done pap smear tests. Positive factors were associated with recent tests that should be considered among women entrepreneurs, which are awareness of contraceptive methods, knowledge of benefits, and positive attitude to cervical cancer tests. Cervical cancer in 2012 affected more than half a million women worldwide, especially in developing countries such as Malawi. Although this disease is preventable and its rate can be reduced through two methods of vaccination and screening, the percentage of doing these things in Malawi is reported to be very low. Kamanga et al. (2023) conducted a study to determine the reasons for not using screening services. Their statistical sample included 24 women, and five health workers who stated the reasons for not using screening services were lack of awareness and concern about pain. Also, one of the other factors was the negative view of cultural and religious beliefs towards screening services. The suggestion of this study is to increase women's awareness of screening services and address cultural and religious misconceptions, both of which increase the use of screening services. Figure 7 shows the organizational framework of publications related to cluster 3.

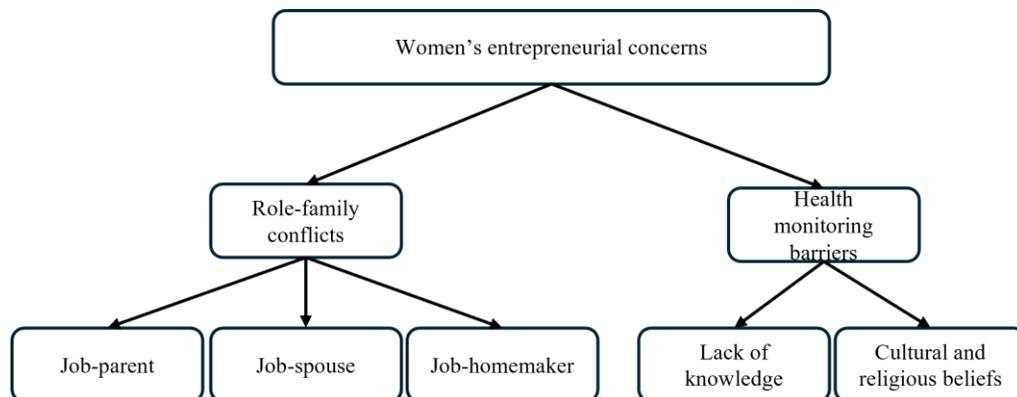


Figure 7.
Women's entrepreneurial concerns.

4.1.4. Cluster 4: Entrepreneurship-Family Structure (C4: Red Cluster)

This theme explains the effects of women entrepreneurs having multiple. Indeed, it describes how factors such as marriage, parenting, family dynamics, school, and work commitments may lead to high levels of stress, which can affect women entrepreneurs' mental health and even lead to decisions such as divorce. In addition to investigating the effect of marriage on women's entrepreneurship, the researchers addressed this topic from the gender perspective. They have also investigated the types and quality of marriage. Muhammad et al. (2019) used Agen's theory of planned behavior to examine how different types of marriage in Muslim societies affect women's intentions to start their businesses. Interviews were conducted with 20 Muslim women entrepreneurs, and the results showed that marriage - whether

forced or chosen - affects their goals and business. Their study provided valuable insights into the complexities of women's entrepreneurship in traditional settings and hypothesized that an individual's marital status influences their aspirations for their business. In addition to the types of marriage mentioned above, another type that has been researched is child marriage and its impact on women's entrepreneurship.

Mondal & Deb (2023) investigated the effects of a one-time grant in West Bengal, concluding that the grant improved women's growth, reduced child marriage and school dropout rates, and improved girls' empowerment. Researchers also investigated other forms of relationship known as cohabitation. For example, Özcan (2011) concluded that cohabitation had no effect on the transition from employment to self-employment for either gender, but marriage did. The partner's previous experience influences self-employment and especially encourages women to enter the business world. In addition to the types of marriages and relationships, marriage quality is another critical factor affecting women's entrepreneurship. For example, Yadav and Kumar (2022) found in their survey that marital quality positively affects the satisfaction of women entrepreneurs. As a result of low-quality marriage, divorce may occur in many cases. Researchers studying marital dynamics have identified divorce as one of the potential consequences of low marital quality. For example, Lurtz et al. (2020) conducted a study that examined gender and divorce among US financial planners. They discovered that the divorce rate of female planners is much higher than that of male planners. They identified factors associated with divorce among planners, which include age, aspirations for work-life balance, agreement, cooperation, and lifestyle flexibility. Work-family dynamics significantly influence the marital quality of women entrepreneurs, with conflicts and balance between these spheres being a primary determinant.

Within the field of female entrepreneurship, scholars have focused on the complex balancing act between the demands of married life and those of the workplace. The impact of changing husbandly responsibilities in women entrepreneurs' relationships and businesses was the main emphasis of Nikina et al. (2015). They employed a theoretical framework that combined psychological contracts, gender role ideology, and marriage contract theory. Through the analysis of interviews with twelve couples from Scandinavia, their study revealed that marital harmony is a key factor in the degree of spousal support given. The knowledge gained from this study clarifies how marriage relationships, spousal responsibilities, and company management interact. Monteith and Camfield (2019) conducted four years of longitudinal research with female Ugandan entrepreneurs. Their findings demonstrated the contrasting character of social and familial connections, which can both bolster and constrain entrepreneurial endeavors. In addition, Tschirhart et al. (2019) conducted a study on female Thai massage therapists working in Norway and investigated psychological stressors and coping strategies. They selected 14 Thai women for interviews and examined pressures related to financial issues, loneliness, cultural adjustment, and marital conflicts, the latter being the most important.

Esfahani and Shajari (2012) state that lending higher education to women can help empower women with solutions to economic problems affecting Iran and other regions. Bjuggren & Henrekson (2022) noted that women who are highly educated but married to high-earning husbands opt for self-employment and for a lower likelihood of being trapped in low-paid jobs with unfavorable hours of working. It assists them in retaining the chances of being part of the workforce and gaining recognition from society against the spouse concentration stigma. Nonetheless, self-employment may pose certain economic disadvantages yet is regarded as an opportunity to achieve the dual birds of work-home balance and follow societal rules and regulations. As shown in Figure 8, the organizations behind publications related to Cluster 4 are depicted.

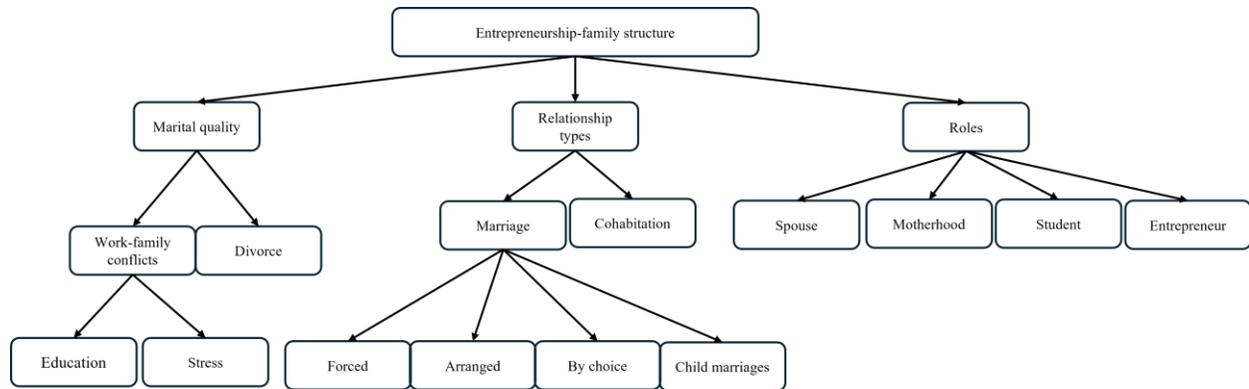


Figure 5.
Entrepreneurship-family structure.

4.1.5. Cluster 5: Cultural Problems of Women's Entrepreneurs (C5: Orange Cluster)

Researchers have taken a closer look at how culture affects female entrepreneurs' business and personal lives. Cullen (2023) addressed how informal institutions and national culture in Turkey influenced the actions of local women who acted as informal entrepreneurs. This study showed that women's informal business initiatives are positively influenced by Turkey's favorable socio-cultural environment. Ahlberg et al. (2023) critically analyzed the Millennium Development Goals, highlighting their vague stance on women's reproductive health and rights. The research emphasized the negative impact of neoliberal, neoconservative, and religious fundamentalist ideologies on women's reproductive justice and autonomy. Murshid et al. (2015) examined the relationship between microfinance participation and domestic violence among Bangladeshi women. Their findings indicated no direct correlation between microfinance and domestic violence, although women with better economic status who participated in microfinance showed a marginally higher probability of experiencing domestic violence. Shahriar and Shepherd (2019) studied the effects of domestic violence on the entrepreneurial endeavors of women in rural Bangladesh. The study found that those who had experienced physical or sexual violence were less likely to initiate new businesses with their microfinance loans, due to decreased self-efficacy and an increased fear of failure. Figure 9 illustrates the organizational framework of publications associated with Cluster 5.

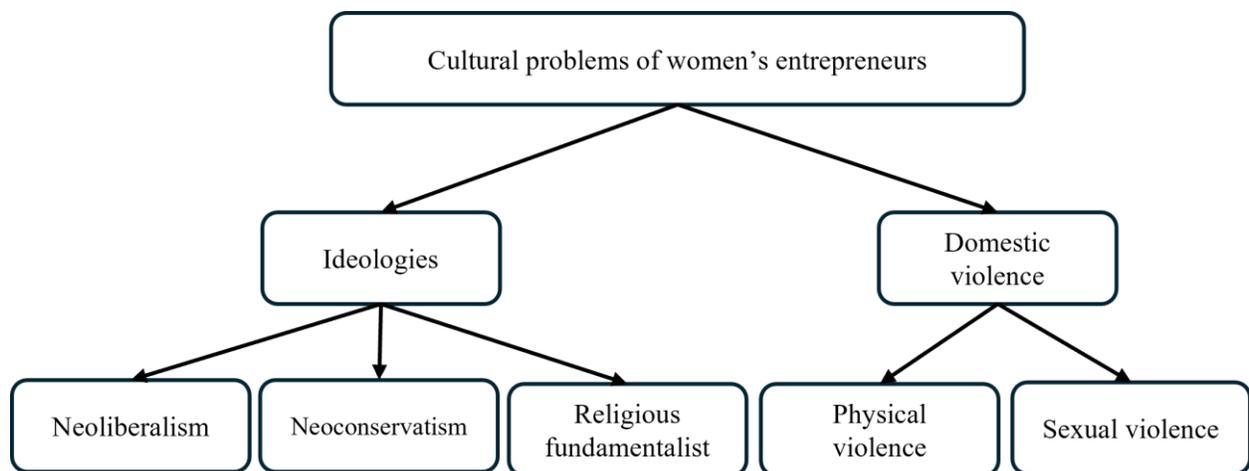


Figure 6.
Cultural problems of women's entrepreneurs.

4.2. Strategic Diagram

The strategic diagram serves as a complementary tool for co-word analysis, determining the status of themes identified by such analysis and aiding in the identification of mature topics, emerging trends, and potential areas for further research or investment within a field. Density and centrality criteria were calculated initially to design the strategic diagram See Table 2.

Table 2.
Strategic diagram metrics.

Themes	No. nodes	No. edges	Density	Centrality
Gender gap in entrepreneurship (C1)	20	49	0.25789	47
Rural women entrepreneurship (C2)	9	13	0.36111	24
Women's entrepreneurial concerns (C3)	13	19	0.24359	35
Entrepreneurship-family structure (C4)	13	26	0.33333	50
Cultural problems of women's entrepreneurs (C5)	9	12	0.33333	18

Based on the information in Table 1, the strategic diagram is illustrated in Figure 5. As observed, only Quadrant III is empty, indicating that there are no declining or emerging themes within the investigated field.

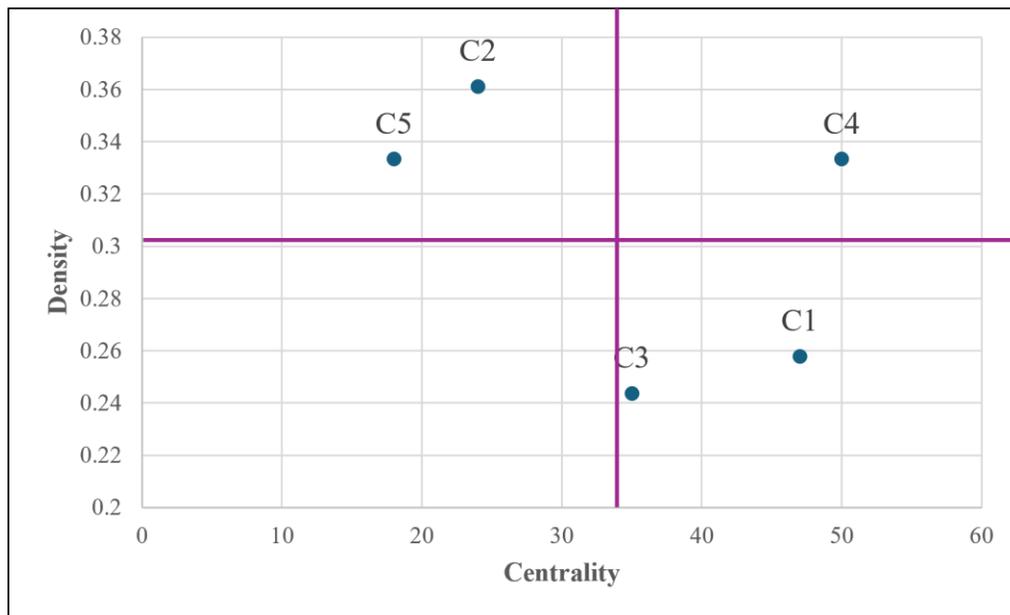


Figure 10.
Strategic diagram.

- **Quadrant I (High Density, High Centrality):** Due to this quadrant's high density and centrality values, C4 is well-developed and central to women's entrepreneurship and marriage. C4 is likely a mature topic with a reasonable amount of research and significant interconnections with other areas of study.
- **Quadrant II (high density, low centrality):** C2 and C5 themes are widely developed but more isolated or specialized. Also, because this quadrant has low centrality scores, C2 and C5 themes are less related to other themes. By combining them with other subjects, future research can examine the practical use of these specialized subjects.

- Quadrant IV (Low Density, High Centrality): Due to this quadrant's high density and low centrality values, C1 and C3 do not show well-developed themes but are integrated with others well. Since these themes are integrated yet underdeveloped, researchers have the opportunity to pioneer new studies that could shape the direction of the field.

The strategic diagram indicates that C4 is a central study area under investigation, although C2 and C5 may represent subtopics within the field. As the discipline develops, themes C1 and C3 can be considered exciting new avenues that could eventually become major themes. All nodes within the same cluster are merged for a more detailed analysis of the strategic diagram. Consequently, this results in a network comprising five nodes and ten edges. The nodes represent the themes disclosed in the co-word network, while the edges denote the frequency with which pairs of themes were concurrently investigated in the same papers. We called this graph a co-theme network, illustrated in Fig.6. The larger the nodes, the more central they are within the network. The thicker the edges, the greater the interaction between their corresponding nodes within the network. The network's edges are labeled with numbers indicating the frequency of interaction between nodes.

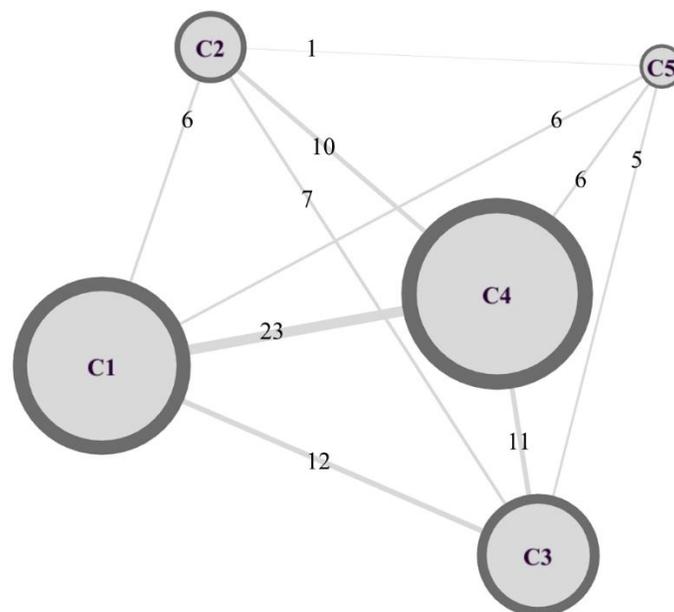


Figure 7.
Co-theme network.

4.3. Conceptual Framework

The co-theme network states that C4 (entrepreneurship-family structure) is the most prominent theme, with 50 joint contributions from other themes. Women entrepreneurs frequently play numerous roles, such as motherhood, education, and partnership obligations, impacting different aspects of their entrepreneurial ventures. This complex impact prompted scholars to examine role ambiguity among female entrepreneurs across various academic fields. However, we limited consideration to edges weighing more than 10 to arrive at a more trustworthy conceptual mode. As a result, the co-theme network takes on the structure seen in Figure 7.

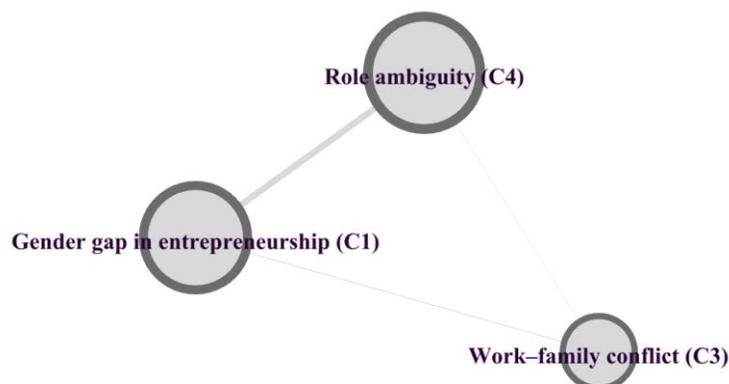


Figure 12.
Conceptual framework.

Role ambiguity and role conflict are closely related but are considered distinctive within the workplace domain (Schmidt et al., 2014). Role ambiguity refers to the uncertainty regarding the expectations that a person should perform in order to achieve their goals (Albort-Morant et al., 2020; Rizzo et al., 1970), while role conflict explains the inconsistency in declared expectations (Kahn et al., 1964; Maden-Eyiusta, 2021). If the conflicting roles (See C3) for a person remain unmanageable and uncontrollable, it leads to confusion about their various responsibilities (See C4). Thus, role ambiguity is intensified by the increase in conflicts between roles (Carbone et al., 2022).

When someone feels incongruent in fulfilling their duties at work and home, it usually leads to a type of role conflict known as work-family conflict (Dodanwala et al., 2023; Greenhaus & Beutell, 1985). Marriage adds new responsibilities to women entrepreneurs (see C4), such as taking care of the home, which affects their business and makes it more difficult for them to combine work and family duties (Hilbrecht, 2016; Xheneti et al., 2021). Therefore, it can be concluded that work-family conflicts (refer to C3) have great potential to exacerbate role ambiguity (refer to C4) among female entrepreneurs. Married women may have other family responsibilities outside the home, such as parenting and husband responsibilities, which may exacerbate the conflict between work and family..

Various studies (e.g., Brieger et al., 2023) found that female entrepreneurs have more work-family conflicts than their male counterparts (see C3). Women often choose part-time work when they are under pressure as a way to solve work and family problems. Consequently, these conflicts worsen the gender gap in entrepreneurship by limiting women's participation in entrepreneurial activities relative to men (Chen et al., 2022; Stier & Yaish, 2014; Yang & del Carmen Triana, 2017). Likewise, role ambiguity may hinder women's social capital, essential for successful entrepreneurship. This may reduce the number of women starting their businesses and increase the gender gap in this area (see C1). Overall, the conceptual model in Fig.13 is updated.

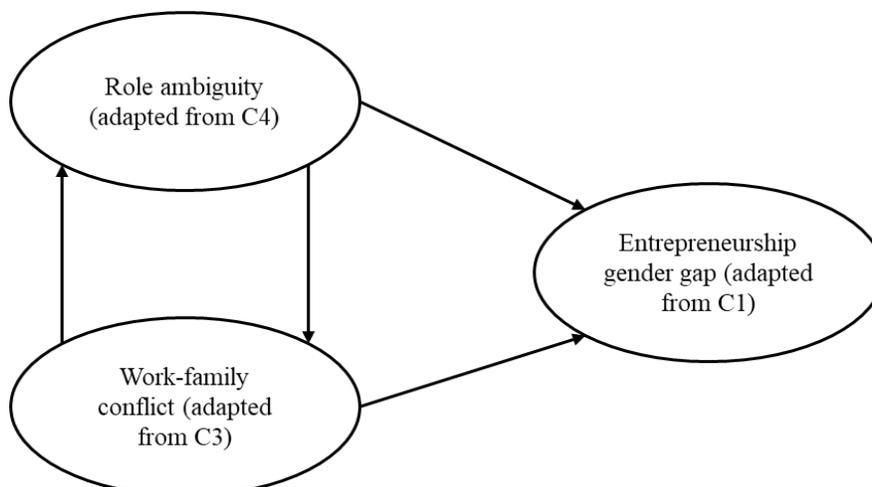


Figure 13.
Conceptual framework of women's entrepreneurship gender gap.

The co-theme network depicted in Figure 12 was pivotal in uncovering the synergistic research efforts across various domains. It also directed our attention to the nuances within the clusters, leading to the formulation of a conceptual model. This model explicates the roles of role ambiguity and work-family conflict in mitigating and exacerbating the gender gap in women's entrepreneurship. It is noticeable that other conceptual models can be designed by concentrating on the relationships between the other sub-fields of the disclosed clusters. The co-theme network shown in Figure 13 played an important role in revealing collaborative research efforts in multiple contexts. It also helped us focus on subtle differences between clusters, which allowed us to draw a conceptual model. This model explains how work-family conflict and role ambiguity contribute to and exacerbate the gender gap in women's entrepreneurship. More conceptual models can be developed focusing on the connections between different sub-branches of the revealed clusters.

5. Conclusion, Limitations, and Future Directions

This paper conducted a bibliometric analysis to analyze marriage in women's entrepreneurship. At first, using a co-word analysis, five main themes were identified: gender gap in entrepreneurship, rural women entrepreneurship, work-family conflict, role ambiguity, and women's empowerment. Second, a strategic diagram was employed to determine the status of the themes disclosed in the concept of centrality and development. It was found that role ambiguity has not only developed internally more than the other themes but also plays a mainstream role, which has been investigated many times by other identified themes. According to the strategic diagram, it was found that the gender gap in entrepreneurship and work-family conflict themes could not develop internally well, but their basics were used by the other themes effectively. Indeed, these two themes are like basic mathematics for advanced engineering concepts. Thus, working on the theoretical aspects of these themes is suggested for future works. Conversely, it was found that rural women's entrepreneurship and women's empowerment themes have developed theoretically well, but they cannot be applied to other themes. So, finding their new applications in the other disclosed themes is suggested for further research. Third, by analyzing the external relationships of the identified themes, a conceptual framework was designed that shows the role of work-family conflict and role ambiguity in the entrepreneurship gender gap. Based on the provided framework, work-family conflict positively influences role ambiguity and the entrepreneurship gender gap. Also, it disclosed that role ambiguity positively influences the entrepreneurship gender gap. Although the provided framework is insightful for researchers and practitioners, it must be evaluated in different contexts.

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