

Government initiatives in women's digital entrepreneurship for promoting human capabilities: insights from a quantitative study in a Brazilian city

Abstract

In Brazil, the pandemic-induced economic crisis has profoundly impacted women, highlighting pre-existing labor market fragilities and gender inequalities. Mass layoffs and social distancing have exacerbated unemployment among women, revealing not only economic but also emotional and social vulnerabilities. This research work investigates socioeconomic factors affecting women's participation in digital entrepreneurship, with a focus on the importance of education and autonomy in promoting equity and sustainable development. The study, based on Amartya Sen and Martha Nussbaum's Theory of Capabilities, examines students from the Mulher Líder Course in Niterói. Using a quantitative approach, questionnaires identify motivations for training, technological proficiency, and socioeconomic conditions. Data analysis reveals correlations between education, experiences of violence, and interest in digital entrepreneurship. Findings underscore the need for public policies supporting female entrepreneurship, emphasizing technological proficiency, education, and access to credit. The study suggests that technological training and formal education can mitigate economic and social barriers, enhancing employment conditions and professional development for women.

Introduction

In Brazil, the economic crisis resulting from the pandemic had a profound impact on the economy, being systematically more severe for women. In a post-pandemic scenario, where many people were laid off due to the economic repercussions of social distancing during the COVID-19 pandemic, the situation worsened for working women. "Data and statistics have shown that many women became unemployed during the pandemic, and consequently, various negative factors were added to their lives" (FONTOURA and REIS, 2022, p. 525). The need to develop public policies for women in vulnerable situations became more than necessary to reduce inequalities. The worsening vulnerability made them more susceptible to job loss and economic difficulties (AZEVEDO. 2022, p. 65).

To address the socioeconomic crisis among people in social vulnerability, the use of technology for entrepreneurship has been a way for women to boost their small businesses in search of financial independence. In this context of social distancing, the *Mulher Líder Course in Niterói*, the subject of this research, emerged as an initiative to motivate female participation in digital entrepreneurship, aiming to train entrepreneurs for this new way of doing business and mitigate the barriers imposed by the epidemic. The group of over three hundred students in Niterói, Rio de Janeiro, who began their activities in 2022, promoted by the Coordinating Office for Women's Policies and Rights (CODIN), now the Women's Secretariat.

As a theoretical lens, this research used Amartya Sen's Capability Approach, which proposes a multidimensional approach to assessing human development. Sen argues that gender issues should be understood through the capabilities and functionalities people possess, rather than just considering the means to achieve them. He emphasizes the importance of the freedom and opportunities individuals must make choices and achieve their goals, considering factors such as health, education, and social participation. Nussbaum complements this view by highlighting that the promotion of well-being should focus on the internal and external capabilities that allow people to exercise their potentials. To achieve human capabilities, conversion factors—such as sociodemographic and contextual characteristics—can enable or restrict a list of human capabilities.

Through an exploratory quantitative analysis with participants in the digital entrepreneurship experience in Niterói, this research sought to discuss how socioeconomic characteristics influenced the achievement of participants' individual capabilities. We applied factorial analysis to identify underlying relationships among various variables in our study. This statistical method allowed us to reduce data complexity by grouping related variables into factors. By doing so, we could better understand the patterns and correlations, leading to more insightful conclusions about the socioeconomic characteristics influencing women's digital entrepreneurship.

The analysis of the data highlights significant correlations between educational attainment, experiences of violence, and interest in digital entrepreneurship. The findings emphasize the urgent need for public policies that support female entrepreneurship, with a particular focus on technological proficiency, education, and access to credit. The study indicates that technological training and formal education can play a role in overcoming economic and social barriers, thereby improving employment conditions, and fostering professional development for women.

Theoretical background

Capabilities Approach

Amartya Sen's capabilities approach postulates that the quality of life should be evaluated based on the substantive freedoms or capabilities of individuals to achieve valuable functionings. In this way, "the evaluation of a life is the evaluation of the capabilities to realize these activities and functionings" (Mariano, Souza & Ferreira, 2018). These functionings encompass a wide range of human activities and states of well-being, such as being well-nourished, healthy, literate, and participating in political life. Capabilities, in turn, represent the opportunities individuals have to convert these functionings into real achievements.

A long-standing influence on my work on justice, especially with regard to freedoms and capabilities, has come from Martha Nussbaum. Her work, combined with her firm commitment to developing the "Capabilities Approach," has profoundly influenced many of the recent advances of this perspective, including the exploration of its connection to the classical Aristotelian ideas of "capability" and "flourishing," and to works on human development, gender studies, and human rights. (SEN, 2011, p. 37).

He emphasizes the importance of substantive freedoms and individuals' opportunities to achieve essential capabilities. We can consider how the barriers faced by women affect their capabilities and, consequently, their success as entrepreneurs. Some women face violence, for example, and may have their capabilities linked to entrepreneurship negatively affected, as violence can limit their autonomy and access to resources. We cannot fail to associate violence against women with gender inequality.

explanatory hypotheses for the persistence of these phenomena in Brazilian society, despite the advances obtained through the political pressures of the feminist movement since the 1960s, for gender equality; and the constitutional guarantee of the right to equal pay between men and women, enshrined in the Federal Constitution of 1988. (FERREIRA, BOHNENBERGER, SCHMIDT, 2021).

This information points to a need for the implementation of public policies, from a gender perspective, in order to reduce inequalities: higher unemployment among women, lower wages than men, even when occupying the same professional position; high participation in the informal market and in precarious and low-paying occupations. Through quantitative research in a case study carried out in Caxias do Sul, the same author identifies some data that demonstrate the wage gap by CNAE:

From complete high school, female participation exceeds the overall average of 42.2%. At the complete higher education level, it exceeds 50%. At all levels of education, there is a wage gap, with the smallest disparities occurring at the extremes of the table: among illiterate workers (where remuneration is low, close to the minimum wage) and among workers with complete higher education (where remuneration is higher). (FERREIRA, BOHNENBERGER, SCHMIDT, 2021).

These are some of the central human rights for development that need to be guaranteed, pointed out by Amartya Sen: Long and healthy life; Education; Political participation and civil liberties; Economic security; Access to productive resources; Freedom of choice and autonomy; Social and cultural participation; Freedom of expression and thought. They are some of the fundamental capabilities, which he affirms are related to his approach to human development. "This approach highlights the importance of expanding people's capabilities and opportunities so that they can live dignified and meaningful lives." (PINTO, MACADAR & PEREIRA, 2022). These capabilities are fundamental, according to the philosopher, for social and economic development.

According to Pinto, Macadar & Pereira (2022), the "Capabilities Approach (CA) is a conception of equality of opportunity that highlights the substantive freedom that people have to live their lives" (SEN, 1999). For the authors, the country's development can also be evaluated by the degree to which freedom is offered to individuals. The quality of people's lives should be measured primarily by the condition that the State gives them to expand their capabilities, and then this becomes a two-way street, "the freedom to achieve various lifestyles" (SEN, 2000, p. 75).

Still according to the author, if on the one hand the State values and increases people's capabilities through public policies, on the other hand, these policies are stimulated by the effective use of people. Sen (1999) argues that to transform resources, also understood as commodities, into capabilities, individuals need to have freedom, which makes their choice possible. (PINTO, MACADAR & PEREIRA, 2022).

2.2 WOMEN'S DIGITAL ENTREPRENEURSHIP

In recent years, the internet has expanded access to education and digital training, "the results obtained revealed that digital entrepreneurship by women has been driven by social inclusion" (SANTOS, J.M. et al, 2023), women's empowerment, poverty reduction, and stimulation of regional economic growth and development. Digital entrepreneurship "is developing more and more and is evident in Brazilian society, based on the creation of a business focused mainly on digital means or on the transformation of existing businesses". ((RODRIGUES PINTO, SANTOS and MARTENS, 2021, p.114).

Entrepreneurship associated with technology has grown in a wide variety of sectors, from e-commerce, dropshipping, blogs, social media, online consulting, WhatsApp business, and app development. In addition, some women are standing out as digital influencers, building followers on platforms such as: Instagram, YouTube, TikTok, and blogs. This not only allows them to monetize their content but also to influence public opinion and promote causes. However, "the entrepreneurs in question, however, still operate in an incipient way in the digital economy." (SANTOS, J.M. et al, 2023).

Entrepreneurship associated with technological tools can represent an opportunity to create income for women who are in the informal sector, "it was found in research that entrepreneurship aligned with the use of Information and Communication Technologies by women allows flexibility for obtaining income, awakening professional motivations and stimulating female autonomy." (SANTOS, J.M. et al, 2023)

WOMEN'S ENTREPRENEURSHIP THROUGH THE LENS OF THE CAPABILITIES APPROACH

Entrepreneurship, therefore, can be a vehicle for expanding human capabilities, such as: Entrepreneurship is a primary source of job creation. By creating jobs, entrepreneurs contribute to the ability of individuals to earn a living, support their families and achieve economic security. This, in turn, increases their ability to access education, health and other essential goods and services (GRIES, 2011). Successful ventures generate income, which can be used to improve living standards, access quality healthcare and invest in children's education. These factors contribute directly to the physical and mental well-being of individuals, as well as to their overall quality of life (CYFER, I. 2010). Entrepreneurship is often associated with innovation and technological advances. These innovations can lead to the development of new products and services that improve people's lives. "Unfortunately, technological innovation, economic growth and improved productivity do not automatically translate into human development". (GRIES and NAUDÉ, p.216). For example, innovations in health, education, and agriculture can have a profound impact on human development if they are evaluated as development measures, "there is still no adequate theoretical definition for thinking about the development of entrepreneurship using the multidimensional measurement of human development" according to Alkire and Foster (2008). Entrepreneurship empowers individuals, providing them with opportunities to control their economic destinies. It promotes a sense of agency and self-confidence, which are essential for human development. (GRIES, 2011)

Methodology

Aiming to understand and to discuss the socioeconomic factors influencing women entrepreneurs in the use of digital tools for entrepreneurship in the city of Niterói, this research undertook an exploratory quantitative study, focusing on the analysis of sociodemographic aspects to assess the data set of 306 students enrolled in the MULHER LÍDER program, through a form, in the period from the year 2021 until the second half of the year 2023, from information kindly provided by the Coordination of Women's Rights - Niterói (CODIM).

In the questionnaire, among the sociodemographic factors, questions were included on issues of gender violence. According to the study by the Brazilian Forum of Public Security (FBSP), crimes against women are increasing throughout the state of Rio de Janeiro. (SENTO-SÉ, 2022, p.109).

3.2 VARIABLES ANALYZED

- A. Education level: Education level of the participants.
- B. Familiarity with Technology.
- C. Level of comfort and use of digital tools.
- D. Company Size: Size and capacity of the companies led by the participants.
- E. Experience of Violence: Analysis of the impact of gender violence on women entrepreneurs.

3.3 CORRELATIONS BETWEEN VARIABLES

The questionnaire model was formulated from objective and measurable questions. "When interpreting factors, it is necessary to make a decision about which factor loadings are worth considering." (HAIR et al, 2009, p.119). This means that the questions in the questionnaire were formulated in order to obtain specific and quantifiable answers. Entrepreneurs from different areas and different stages of business were selected, seeking to quantify specific answers and analyze them statistically and seek through data mining, if it is possible to trace a pattern present in this population of women.

The selection of entrepreneurs from different levels of education and different stages of business was a strategy to obtain a comprehensive and representative view of the entrepreneurial reality of the city of Niterói and to represent this population. We opted for the use of the "R" software to facilitate statistical analysis. The R statistical program, in the view of (SALDANHA. BASTOS & BARCELLOS, 2019), is a versatile programming language, which allows from data manipulation to its analysis by means of statistical methods.

3.4 EXPLORATORY DATA ANALYSIS

The multivariate factorial analysis was chosen as a statistical method because this methodology allows to concentrate data sets that involve more than one variable. The exploratory analysis aims to explore and understand the characteristics of a data set, identifying patterns, trends and relationships between variables. Lobo (2020) states that "in this way, we can describe the EDA as a set of methods suitable for the collection, exploration and description and interpretation of sets of numerical data". Some examples of methods include scatter plots, histograms, box plots, correlation analysis and statistical summary. The focus is on the description of the data, the detection of anomalies and the generation of hypotheses about the relationships between variables.

The method of quantitative analysis used was multivariate analysis which "provides researchers with the ability to evaluate differences in one or more independent variables" (HAIR et al, 2009, p. 334). Therefore, this approach is used in a wide range of fields, including statistics, social sciences, natural sciences, economics, marketing, psychology, among others.

3.6 SAMPLE GROUP

The group in which the questionnaire was applied, was formed by students who are being trained in three axes of entrepreneurship, the course is based on the training program: Leadership, technology and innovation. Created in 2021, the Women Leader Program is an initiative created by the City Hall of Niterói led by the Coordination of Policies and Rights of Women.

The MULHER LÍDER course, which is offered free of charge, is coordinated by a body of professors who act as volunteers. The entrepreneurial students seek disciplines such as: Leadership development, Emotional intelligence, Negotiation, Strategic planning, Business plan, Notions of Graphic design, Marketing and Digital content, in addition to Digital entrepreneurship. The Course was shaped to serve women in situations of vulnerability, but is accessible to any woman, as long as she is a resident of the city of

Niterói and can demonstrably attest to this bond. It does not necessarily need to have gone through a situation of vulnerability or violence, those who seek this issue, whether gender or domestic, have a percentage of vacancies reserved for these cases.

3.7 SAMPLE

We selected with parsimony and the questions in order to ensure that the data collected is representative, reliable and useful for the objectives of this research. We used a sample of a group of women who will be the focus of this research, entrepreneurs who enrolled in the Women Leader Course in the city of Niterói between the years 2021, 2022 and 2023 aged between 18 and 65 years. The sample size was determined by sufficiency, that is, we applied the questionnaire to all participants. The questionnaire prepared by the research needed to ensure the privacy and security of the respondents, with the due authorization and availability by the Women's Secretariat of Niterói, the body responsible for the Course. It is necessary to make it very clear that the local laws and regulations related to data privacy and research are followed, in addition to ensuring that the information of the respondents was treated ethically and responsibly.

3.8 DATA COLLECTION

The collection was carried out through online questionnaires, after data collection, the answers were analyzed using statistical techniques and relevant methods already mentioned above to extract insights and conclusions. The objective of creating a relevant and well-structured questionnaire that addresses the main topics to be explored in this research, seeking to ask clear and objective questions. (FREITAS & MOSCAROLA, 2002, p.11)

To distribute the questionnaire through social networks and e-mails, we used Google Forms. After data collection, we applied the graph analysis tools, processing the Excel data and mined the research variables using the "ggplot2" Library.

The questionnaires were distributed through social networks, the groups of students of the entrepreneurship course and through e-mail to the students enrolled in the leader woman Course, in agreement with the direction at the time of CODIM (Coordination of Women's Rights) - Niterói. It was necessary to obtain permission from the relevant authorities with the Coordination, to collect the data through these channels. This needed to involve ensuring that the data would be treated confidentially.

In the research, we obtained a total of 306 responses from entrepreneurial students of different ages and backgrounds, who took the Course in classes in the period between 2021 and 2023. These responses were analyzed based on the theoretical framework of Sen and Nussbaum, through an understanding of the capabilities and substantive freedoms of these students. The capabilities approach, proposed by Amartya Sen and developed by Martha Nussbaum, emphasizes the importance of context and social structures in the formation of individual capabilities. The entrepreneurial students, by sharing their experiences and challenges, illustrated how factors: gender, socioeconomic status, level of education and technological proficiency. Variables that significantly influence their ability to start and develop businesses,

Absolutely! Here's the translation of the text into English, maintaining academic language:

3.9 STUDY VARIABLES

The sociodemographic variables included age, education level, level of technological proficiency, income, and previous experience in entrepreneurship. Other variables of interest will include the type of digital venture, time in operation, and challenges faced, whether they have already been served by any CODIM equipment, whether they have suffered any situation of gender or domestic violence.

3.9.1 Most relevant variables from the research results

I. Education level: The data indicate that 39.22% of women entrepreneurs have higher education. There is a comparison between different levels of education and the experience of violence, with women who have incomplete higher education presenting the highest proportion of "Yes" answers to the experience of violence (57.63%).

II. Familiarity with Technology: Familiarity with technology is measured, and 48.04% of women consider themselves relatively familiar with technology.

III. Company Size: The majority of companies are of Informal size (56.54%).

IV. Experience of Violence: A significant proportion of women entrepreneurs reported having suffered violence (49.02%).

V. Digital Insertion of the Business: There is a correlation between the experience of violence and the desire to insert businesses into the digital environment. The majority of women who have suffered violence (67.33%) express the desire to digitize their businesses, while the proportion is lower for those who have not suffered violence (52.38%) and for those who are not sure (36.67%).

VI. Interest in Inserting the Business into the Digital World: Women who have not suffered violence also demonstrate interest in digitizing their businesses (52.38%), but a significant portion already has a digital presence and seeks help to improve it (46.03%). Similarly, the majority of women who are unsure about the experience of violence already have a digital presence, but seek improvements (63.33%).

3.10 Findings

Our experiment resulted in a structured data set, on which exploratory analysis was used to visualize the relationships between sociodemographic variables and female entrepreneurship, using quantitative data to explore these relationships.

Female entrepreneurship is an emerging field with unique challenges, including overcoming social barriers and integrating technologies. We seek to explore how these variables influence the trajectory of women entrepreneurs in a regional context. Thus, an exploratory analysis of the data provided by the population of entrepreneurs was carried out. The analyzed sample reveals information about Education level, familiarity with

technology, company size, experience of violence and the insertion of businesses in the digital environment.

The results indicate that the experience of violence and Education level are significant factors that influence the decision of women entrepreneurs to insert their businesses in the digital environment. Women with incomplete higher education more frequently report having suffered violence, while women with specialization report the lowest proportion of experiences of violence. The research highlights the importance of public policies and education programs that promote female entrepreneurship and the use of technology, especially considering the experiences of violence and the need for support for digital improvement.

3.10.1 Data Analysis process

The document presents a step-by-step data analysis using the R software and the tidyverse package. Initially, the research data were imported from an Excel spreadsheet into R, and then treated and prepared for analysis. The graphs were made using the ggplot2 library (WICKHAM, 2016) within "R".

The columns of interest were selected and the missing values removed. The variables were transformed into factors and the resulting data set saved as a CSV file.

The descriptive analysis was performed, providing a statistical summary of the variables, including the age range of the entrepreneurs, experiences of gender violence, familiarity with technologies, company size, education level, and revenue in the last year. The graphical analysis was performed using the FactoMineR and facto extra packages, with a Multiple Correspondence Analysis (MCA) to explore the relationships between the categorical variables.

The results can be visualized through graphs and biplots, allowing a better understanding of the associations between the different categories of the studied variables. The document also includes a reference to the article by Wickham (2019), which introduces the concept of the tidyverse, a set of software packages for data science in R, which promotes a consistent approach to data processing.

After a first treatment of the data in Excel, we imported the file into R using the tidyverse package and the read_excel function (Wickham et al. 2019).

3.10.3 Obtained Results

It should be emphasized that the analysis performed corresponds to the data from a specific group of women entrepreneurs in the city of Niterói. The results obtained provide important indicators to support policies, programs and support strategies for women's entrepreneurship in the region.

Among the multiple factors, we highlight:

A. Education level: Education level is also an important factor, as it influences women's ability to deal with the complexities of the digital world and to access educational resources that may be necessary for the success of their ventures. The majority of women

have higher education (37.3%), remembering that the city of Niterói has several Universities, including UFF (Fluminense Federal University). Sociodemographic factors can influence women's choices and experiences.

B. Familiarity with Technology: Most women consider themselves relatively familiar with technology (45.5%), which indicates a good level of skill and comfort for the digitization of businesses. This information can help identify formats of digital training that can be applied to the group of entrepreneurs. How familiar they are can indicate how the degree of digital training can suggest the need to create specific technical programs that develop proficiency in the use of technologies by entrepreneurs in the group who are not at all familiar (4.5%) and little familiar (23.1%).

C. Company Size: The majority of companies are informal (56.54%). The expected results can contribute substantially to identifying strategies to support economic development in the region, suggesting the creation of policies to promote this group. An important piece of data is that (38.8%) of women are formally registered as Individual Microentrepreneurs (MEI), with a minimal number of small and medium-sized enterprises.

D. Experience of Violence: Almost half of the women reported having suffered violence (49.3%). However, 9% are not sure, that is, they may have suffered some situation of violence, which may suggest that they do not feel courageous to affirm or even do not have sufficient critical awareness to understand that they have gone through this situation. According to Potin (2021), Nussbaum points out the importance of recognizing bodily integrity as empowerment. Therefore, it is important that the State guarantees the application of laws that guarantee the rights to the physical integrity of women so that they can develop their capabilities fully.

E. Interest in inserting Businesses in the Digital World: The vast majority of women express interest in digitizing their businesses in the post-pandemic period. A significant portion already has a digital presence. In this way, we understand that this interest in doing business in the digital is an important and highly relevant way of undertaking for this group. We observe that, regardless of the experience of violence, the majority of women entrepreneurs seek to insert their businesses in the digital world or improve their existing digital presence.

F. Age range of the entrepreneur: Women have a fairly diverse range, from 18 years old, according to the graph, we can see that most of them are in the range between 38 years and 55 years old. A piece of data that reinforces the importance of digital training is that even with most women having a degree of higher education complete and incomplete, they need help for technological training.

3.11 EXPLORATORY ANALYSIS AND THE RELATIONSHIPS BETWEEN SOME VARIABLES

Below is a visualization of the first stage of data mining, where we highlight four factors identified as relevant for this analysis of the relationships between some of the sociodemographic variables and female entrepreneurship within our sample.

Most relevant variables:

- A. Education level: Higher Education (39.22%)
- B. Familiarity with Technology: Relatively Familiar (48.04%)
- C. Company Size: Informal (56.54%)
- D. Experience of Violence: Yes (49.02%)

3.11.1 Exploring the possibility of inserting the business into the digital environment

The exploratory analysis of the data presented reveals some significant correlations between sociodemographic variables and female entrepreneurship, particularly in the context of the digital insertion of businesses. First, there is a clear association between the experience of violence and the desire to digitize businesses.

The graph presented below illustrates the relationship between familiarity with technologies and interest in inserting the business into the digital environment. It is noted that the majority of respondents who consider themselves "relatively familiar" with technology expressed interest in digitizing their businesses, with 90 students affirming "Yes". This group also presented a significant number of people who are already in the digital environment, but who still need help (55 responses). In contrast, those "fully familiar" represent a smaller proportion of interest, with only 6 stating that they still have no interest in digitizing their businesses.

Among the "little familiar", there is a balance between those who are interested in digitizing (48 responses) and those who are already in the digital, but need assistance. This suggests that familiarity with technology can influence the desire to transition to the digital environment, but also highlights the need for continued support, even among those who have already taken this step. It is very striking that among all respondents, only 4 students out of a total of 306, have no interest in doing business digitally.

The majority of women who have experienced violence (67.33%) express a willingness to change. This number is considerably higher than the proportion of those who have not experienced violence (52.38%) and those who are unsure if they have experienced it (36.67%). The information can serve as an object of future study to understand the complex relationships between aspects called sociodemographic and the barriers that prevent women from thriving in entrepreneurship. Women with incomplete higher education have a higher proportion of experiences of violence, which may reflect a greater need for support and opportunities that can strengthen their capabilities and skills.

The majority of women who have not experienced violence also demonstrate an interest in inserting their businesses into the digital world (52.38%), thus demonstrating a greater desire for financial autonomy. However, a significant portion (46.03%) already has a digital presence, but feels the need for help to improve it.

There is a correlation between the experience of violence and the desire to insert businesses into the digital environment. The majority of women who are unsure if they have experienced violence already have a digital presence, but seek improvement (63.33%).

The majority of the companies analyzed are of informal size (56.54%), which may reflect the socioeconomic context in which female entrepreneurship develops. Finally, we observe that, regardless of the experience of violence, the majority of women entrepreneurs seek to insert their businesses into the digital world or improve their existing digital presence. Women who have not experienced violence seek help to improve their digital presence (46.03%), while those who are unsure about the experience of violence also seek improvement (63.33%).

In summary, the analysis reveals that digitization is a strong trend among women entrepreneurs, influenced by factors such as experience of violence, education, familiarity with technology and the size of the company.

3.11.2 Education level x Experience of Violence

Education level and experience of violence appear to be factors that influence women's decision to insert their businesses into the digital environment. According to the data provided, women who have suffered violence demonstrate a more pronounced desire to digitize their businesses (67.33%) compared to those who have not suffered (52.38%) and those who are not sure (36.67%).

The graph 10 demonstrates a possible relationship between Education level and the experience of violence, which may indicate that this experience may drive women to seek new opportunities and financial autonomy. One of these ways is through the digitization of businesses.

Regarding Education level, women with incomplete higher education have the highest proportion of "Yes" answers for the experience of violence. On the other hand, women with specialization have the lowest proportion of "Yes" answers for the experience of violence and no answers in the "Not sure" category, which may suggest that a higher level of education may be associated with a lower incidence of violence or a greater ability to seek help and support.

The results obtained in the research are directly aligned with the objective of understanding the dynamics of female digital entrepreneurship and the relationship between Education level and experiences of violence. This indicates that, despite having some level of education, these women may still face significant barriers that make them more susceptible to violence.

On the other hand, the observation that women with specialization have the lowest proportion of "Yes" answers and no answers in the "Not sure" category suggests that a higher level of education may be associated with a lower incidence of violence. This trend can be interpreted as a reflection of these women's greater ability to seek help and support, in addition to greater autonomy and empowerment that higher education can provide.

Regarding this collected and analyzed material, we were able to observe that:

1st. Women enter digital entrepreneurship in the city of Niterói, not only for a genuine purpose, but to overcome their condition of social vulnerability, as demonstrated in Graph 9. According to Da Fontoura, et al, 2022, many women became unemployed during the pandemic, as a consequence of this, several negative factors were added to their lives,

therefore it is necessary that, in addition to guaranteeing rights, the State provides subsidies so that these women who find themselves in a situation of vulnerability can return to the market.

2nd. Among the sociodemographic factors, the lack of income is an aspect that leads women to undertake, as shown in graph 3, the majority of entrepreneurs are in informality. For Da Fontoura, 2021, after the pandemic, many women were left without any form of assistance, which further aggravated their daily lives. Leaving entrepreneurship as a way to make resources on their own.

3rd. Among the women who seek entrepreneurship in the analyzed group, those who find themselves in a situation of violence tend to resort more frequently to digital tools. This is due to the understanding that these tools can boost their businesses, providing financial autonomy and helping them to overcome the situation of vulnerability in which they find themselves.

4. FINAL CONSIDERATIONS

Starting from a literature review on female entrepreneurship and the capabilities approach, this study carried out an exploratory quantitative research, to identify the socioeconomic factors that influence women entrepreneurs, participants of the Mulher Líder Project in the city of Niterói.

The understanding of the sociodemographic dynamics that influenced women to seek entrepreneurship and the development of social and technological capabilities in the Course offered by the current Women's Secretariat of Niterói. Through these factors, we seek to obtain relevant data from the group of interviewees, through the methodological use of exploratory data analysis, to obtain specific and quantifiable answers, in addition to using these sets of variables so that they can serve as an instrument for better judgment.

The use of statistical techniques allows the reduction of the complexity of the data of the students of the Mulher Líder Course, and can be quite efficient to deal with this wide set of variables. In this way, the research was able to identify patterns, trends and significant differences in this group of women.

The analysis undertaken revealed significant patterns at the intersection between female entrepreneurship, experience of violence and digital insertion of businesses. The exploratory analysis conducted provides an enlightening view of the profile of women entrepreneurs in our sample, highlighting the digitization of businesses as a prevailing trend. This trend is driven by a constellation of factors, including the experience of violence, the level of education, familiarity with technology and the size of the company.

It is noteworthy and opens the way for further study in future work, the fact that women who have faced the adversity of violence, express a more accentuated desire to digitize their businesses (67.33%), compared to those who have not suffered violence (52.38%) and those who are unsure about this experience (36.67%). This suggests that digitization can be a mechanism of empowerment and security for women in vulnerable situations.

Higher education is predominant among women entrepreneurs (39.22%), reflecting that a solid educational base can potentially empower these women to explore business opportunities and digitization as a strategic tool.

Women with incomplete higher education report the highest rate of experience of violence (57.63%), which may indicate a complex intersection between education and social vulnerability.

Intermediate familiarity with technology (48.04%) indicates a good level of preparation for digitization, pointing to a population of entrepreneurs who are ready to embrace digital tools as an integral part of their businesses.

The size of the company is mostly informal (56.54%), followed by the Individual Microentrepreneur (MEI), pointing to an economic context in which women entrepreneurs operate and seek opportunities for growth and formalization. In view of this, it is imperative that public policies and support programs for female entrepreneurship be sensitive to these factors and develop training strategies that reinforce the formalization of businesses and promote projects that guarantee the safety and well-being of women, especially those in situations of vulnerability. It is essential that these programs recognize digitization as an opportunity and a necessity, providing the necessary support so that women entrepreneurs can explore the digital environment effectively.

In short, it was possible to conclude that the digitization of businesses is a strong trend among women entrepreneurs, especially those who seek to overcome situations of social vulnerability and violence. Education level and familiarity with technology are factors that influence this trend, and the experience of violence seems to be a catalyst for the search for a greater digital presence. Public policies and support programs for female entrepreneurship should consider these aspects to promote training programs and security policies for women entrepreneurs.

The search for training can also be a search for financial emancipation of this group, it is necessary to make a correlation with the theme of violence and gender equality, precisely because part of the analyzed group seeks this space offered by the Women's Secretariat of Niterói, to denounce abusive situations, a situation of vulnerability and even extreme violence, in these cases the students are indicated by the CEAM (WOMEN'S CARE CENTER), seeking training as a means of achieving financial autonomy to get out of the situation of vulnerability.

These capabilities include aspects such as health, education, political participation and autonomy. In the context of female digital entrepreneurship, this theory can be applied to analyze and promote the development of the capabilities of women entrepreneurs. It offers a valuable conceptual framework that can be applied in future work. It establishes a multidimensional focus for the assessment of human development, highlighting the importance of essential capabilities to lead a dignified life. These capabilities include aspects such as: health, education, political participation and autonomy. In the context of female digital entrepreneurship, this theory can be applied to analyze some critical issues to the development of women's capabilities.

CONCLUSIONS AND FUTURE WORK

As future work, the findings and conclusions presented in this research paper can be used for the development of public policies and support programs for female entrepreneurship, as they highlight the need for targeted interventions that consider the degree of technological proficiency, education, access to credit, as a relevant factor in the formulation of strategies to combat gender violence and promote women's financial autonomy. Thus, the results not only corroborate the initial question, but also offer insights for the creation of initiatives that aim to strengthen the capabilities of women entrepreneurs, especially those in situations of vulnerability.

In the academic area, this work can raise qualitative research to deepen the understanding of the experiences lived by women entrepreneurs in different socioeconomic contexts, allowing a richer analysis of the barriers they face and the strategies they use to overcome them. In addition, future investigations can explore the effectiveness of training and support programs, assessing their impact on reducing gender violence and promoting digital inclusion.

The integration of interdisciplinary approaches, which consider social, economic and psychological aspects, can further enrich the debate on female entrepreneurship and contribute to the formulation of more effective and sensitive policies to the needs of women. In this way, the research not only contributes to academic knowledge, but also to the construction of a fairer and more egalitarian future for women.

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