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Gender and Entrepreneurship: a comparative study between the Causation and Effectuation approaches

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ABSTRACT

The literature on the role of gender in entrepreneurship has been growing significantly in recent last years (FRIGOTTO; DELLA VALLE, 2016). However, little has been studied about the influence of gender in the conception of a business venture. In the search for empirical evidence to elucidate the debate about this gap in the literature, this research sought to verify whether there is an association between gender and the approaches Causation - based on causality - and Effectuation – based on contingencies - (SARASVATHY, 2001). For this purpose, a survey was conducted with Individual Micro Entrepreneurs (MEI) in the city of Nova Cruz/RN. A probabilistic random sample of 100 respondents was collected. The survey was composed of closed questions, including the profile of the entrepreneur, company profile and the Causation and Effectuation questions. The techniques of factorial analysis and multiple linear regression were used for data analysis. The results show a positive and statistically significant association between the female gender and the Causation perspective.

Palavras-chave: Gender; Entrepreneurship; Causation; Effectuation.

1. INTRODUCTION

Studies on gender and entrepreneurship have attracted the interest of academic communities, public policy makers and research funding institutions in recent years (THÉBAUD, 2015; FEDER; NITU-ANTONIE, 2017). Issues such as gender asymmetry in entrepreneurship stand out as one of the main objects of literature study (JISR; MAAMARI, 2014; CRESPO, 2017; FEDER; NITU-ANTONIE, 2017).

The Global Entrepreneurship Monitor 2016 report illustrates gender asymmetry in entrepreneurship, highlighting Brazil as one of the three countries where the proportion of women who started business is greater than the proportion of men, along with Malaysia and Indonesia (GEM, 2017). However, the data for the other countries point to a considerable gender asymmetry. In Europe, for example, men are on average twice as likely as women to engage in entrepreneurial activity (GEM, 2017).

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A series of studies in the literature sought to understand factors associated with the act of undertaking a business venture and the respective causes of the existing asymmetry between the genders (DABIC *et al*., 2012; SHINNAR; GIACOMIN; JANSSEN, 2012; ROBLEDO *et al.*, 2015), such a relationship being well documented - although the emphasis is generally given to only one of the genres, with no comparisons being made. However, the influence of the gender in the process of creation of companies was little explored, highlighting until the present moment research by Shao (2012), Frigotto and Della Valle (2016) and De Villiers Scheepers, Boshoff and Oostenbrink (2018).

The process of creating and developing a company has two main approaches: (a) the classical, based on causality and linearity, called Causation; and, (b) the emerging, contingency-based one, called Effectuation (SARASVATHY, 2001; 2009). Thus, the Causation approach is based on decision analysis and planning, while the Effectuation approach operates in a non-predictive logic, in which emerging strategies are applied to opportunities that arise during the entrepreneurial process (CHANDLER *et al.*, 2011; FAIA; ROSA; MACHADO, 2014).

In Brazil, studies have been carried out that associate gender with entrepreneurship constructs, such as Machado, Faia and Silva (2016), who estimated the relationship between Gender and Entrepreneurial Alertness, but did not identify research that correlated the process of creating companies in the light of the cited approaches and gender. In the international scenario, the works by Shao (2012), Frigotto and Della Valle (2016) and De Villiers Scheepers, Boshoff and Oostenbrink (2018) investigated the relationship between gender and the process of business creation.

Due to the fact entrepreneurial process is based on a behavioral perspective, which can be associated to the aspects exposed in the literature as influenced by gender; of the gap found in the literature on the relation of such constructs; and the asymmetry between men and women in the business world associated with the historical positions of women in the public environment, this study presents the following research question: “can gender be associated with a different conception in creating a new business?” To advance this issue, the present study aims to compare the way of undertaking a business venture, by gender, of micro entrepreneurs in the light of the Causation and Effectuation approaches.

For this purpose, we conducted this research through a quantitative paradigm. Thus, we collected data from 100 entrepreneurs registered as Individual Micro Entrepreneurs (MEIs) in the city of Nova Cruz/RN, randomly selected from an instrument that addressed the entrepreneur profile, the company profile and the dimensions of the **Causation** and **Effectuation** approaches proposed by Sarasvathy (2001). For the treatment and analysis of data, we used techniques of factorial analysis and multiple linear regression. Subsequently, we performed the sensitivity analysis and the consistency analysis of the model with the robust regression technique with the statistical packages SPSS® 19 and Stata 14.

Among the 21 gender classifications cataloged by Green and Maurer (2015), the binary categorization was used for the purposes of this research and for operational reasons, which considers the male and the female.

Following this introductory section, the present study is divided into 4 more sections: the following is a theoretical reference, addressing the gender studies in entrepreneurship and the Causation and Effectuation approaches; then the materials and methods are presented; in the fourth section, the analysis and discussion of results is carried out; and, finally, the final considerations and references are presented.

2. THEORETICAL FRAMEWORK

2.1 Gender and Causation and Effectuation Approaches

The relationship between gender and entrepreneurship is the subject of research in different parts of the world, as in the study by Rico and Cabrer-Borrás (2018), in a comparative study carried out in Spain; and as in Bastian, Sidani, and El Amine (2018), who evaluated the gender gap in opening up businesses in the Middle East and North Africa.

Due to a number of historical causes - such as the segregation of the public environment to men, limiting the role of women to domestic activities - men and women are embedded in distinct types of social and professional relationships (VALE; SERAFIM, 2010). Despite the new conception of the roles of men and women, initiated with the feminist movements of the 1960s, it is still possible to see a gender asymmetry in the business world (SEVERIANO, 2007). From this perspective, gender is the result of a social construction, being explained by experiences constructed throughout existence, and not only by biological factors (PAOLONI and LOMBARDI, 2018).

Following this argument, Shneor and Jenssen (2014) point out that given the history of male dominance in economic activity, women may need additional incentives to undertake business ventures, given that gender asymmetry limits female entrepreneurship. Rico and Cabrer-Borrás (2018) corroborate this view, indicating that man still represents the archetype of successful entrepreneur, limiting the epistemological reach of contemporary research on the subject.

The perspective that the gender would affect entrepreneurship was also studied by Gupta *et al*. (2009), who sought to examine the relationship between gender stereotypes and entrepreneurial intentions. The authors point out that there is empirical evidence that, compared to the number of new entrepreneurs, approximately twice as many men open new businesses. This difference is caused by factors associated with gender stereotypes. The results pointed out that there was no statistically significant difference between men and women regarding entrepreneurial intention. However, those individuals who had self-perception associated with the traits, indicated as masculine, had higher entrepreneurial intent. Such evidence undermines the biological perspective that gender would affect propensity for entrepreneurship, but strengthens the perspective that sociocultural factors could explain the greater number of male entrepreneurs.

Following a framework similar to the work of Gupta *et al*. (2009), Laure Humbert and Drew (2010) argue that sociocultural factors can be barriers to female entrepreneurship. The authors aimed to analyze the relationship between gender and entrepreneurial motivations in Ireland, as well as to understand the role of gender in the "push" and "pull" modes of entrepreneurship. The pull factors are associated with the elements that induce people to undertake business ventures, such as the desire for personal fulfillment and the identification of a business opportunity. The push factors are linked to the prospect of entrepreneurship by necessity, such as unemployment and the search for a higher income. The authors also argue that historically, women seek in entrepreneurship factors such as flexibility in work, increased income, search for better working conditions and greater balance between the personal and professional spheres, which would make them more prone to the prospect of entrepreneurship by necessity (push).

According to the "push" and "pull" modes used by Laure Humbert and Drew (2010), it is emphasized that entrepreneurial motivation can occur in two ways, either by necessity or by opportunity. According to the Global Entrepreneurship Monitor (2017), entrepreneurs by necessity are people who did not have or lost their jobs and needed to start a business as a source of income to survive. Opportunity entrepreneurs are people who are visionary and attentive to new business opportunities, who strive to be independent in their way of surviving and existing.

When reviewing the empirical literature on entrepreneurship and gender in the period ranging between 2007 and 2018, we found 39 articles in which gender was used as an explanatory variable of entrepreneurship. In 28 of them, women presented a lower propensity to entrepreneurship, with statistically significant effects. Among them, the most important are the articles by Gupta *et al.* (2009), Laure Humbert and Drew (2010), Shinnar, Giacomin and Janssen (2012), Robledo *et al.* (2015) and Rico and Cabrer-Borrás (2018).

Considering the above, the main reasons identified in the literature for the lower propensity of women to entrepreneurship could be associated with factors related to the process of undertaking a business venture, as in the case **of associations of the male stereotype to the entrepreneurial activity** (GUPTA *et al.*, 2009; THÉBAUD, 2010), which could be a limiting factor to the women's performance from the perspective of the Pre-agreement Factor of the Effectuation approach; **opportunity evaluation** (LAURE HUMBERT; DREW, 2010), which could be associated with the Flexibility Factor of the Effectuation approach and, finally, **greater risk aversion by women** (SHINNAR; GIACOMIN; JANSSEN, 2012), which could be associated with the Acceptable Loss Factor of the Effectuation approach.

In relation to the analysis of the process of creation of companies by gender, the literature is scarce, with the majority of the studies focusing only on the feminine gender, as in Machado, Gazola and Añez (2013). In the international scenario, similar studies were carried out by Shao (2012), Frigotto and Della Valle (2016) and De Villiers Scheepers, Boshoff and Oostenbrink (2018), in order to understand if gender and family background affected the business creation process.

Machado, Gazola and Añez (2013) sought to understand the reasons and difficulties encountered by women to create companies. The study was carried out with a sample of 96 entrepreneurs from the city of Natal (RN), and was conducted through quantitative methods that involved, among others, cluster analysis to identify groups of similar attributes. The main reasons for the creation of the identified companies were the search for job satisfaction and obtaining income. Regarding the main difficulties in setting up businesses, the lack of support from the family, difficulties with small children, lack of experience in the field, lack of time to participate in networks and difficulties in obtaining initial capital were highlighted. The authors also concluded that the reasons that influenced the creation of the companies are related to women's dissatisfaction with the previous conditions of work and income, regardless of the time of creation, initial capital, level of schooling or previous occupation of the entrepreneurs.

In research on the same theme, Pelogio *et al*. (2016) verified whether entrepreneurial women used decision-making processes aligned with the Effectuation logic throughout the creation of their companies. The study used the qualitative approach through the analysis of life histories of five entrepreneurs from the Seridó region of Rio Grande do Norte (RN). With regard to the process of company creation, the desire to achieve personal fulfillment and financial independence, followed by the intention to move to the city where they were created were the main causes. In addition, the results showed that the entrepreneurial women used, in large part, decision-making processes in line with the Effectuation logic. Some evidence has suggested this conclusion, such as: women did not have clear initial goals at the time of the creation of their companies; showed no aversion to the risk of wasting time and money; sought to offer products and services with their own identity with strong connection with the region where they were inserted; and had experience in the field of activity in which they decided to start the business.

In the international scenario, we highlight the studies by Shao (2012), Frigotto and Della Valle (2016) and De Villiers Scheepers, Boshoff and Oostenbrink (2018). Shao (2012) evaluated the impact of gender and family background on the process of setting up businesses in the light of causation and effectuation approaches. To this end, a study was conducted in China with 50 entrepreneurs. The central hypothesis of the study is that male entrepreneurs

are more likely to the effectuation approach than female entrepreneurs are. We applied average difference testing (Test T and Chi²) to identify whether there were gender differences in the way of undertaking a business venture. The results indicate that female entrepreneurs are more susceptible to the scenario of lack of resources in the process of creating companies than men, a scenario that is characteristic of effectuation logic. It is worth noting that despite the relevance of this study, weaknesses related to the research method and size of the sample mean that its findings should be considered with caution.

Frigotto and Della Valle (2016) sought to evaluate the role of gender in the process of business creation. We performed an analysis with mixed methods, aligning content analysis and quantitative analysis techniques such as correlation and regression analysis. The authors concentrated on three main hypotheses. The first is that men are more prone to the Effectuation approach, as they feel more confident in exploiting the necessary resources in the environment. The second hypothesis is that women, according to the literature, demand a greater set of information to increase their confidence. Finally, the authors pointed out that the acceptable losses factor would affect women more intensely than men. The results indicate that women are less prone to Effectuation logic. The authors argue that the lower propensity of women is justified by the fear of negative consequences, and the impact of acceptable losses is greater in women than men In addition, the results demonstrate that women have less perceived behavioral control than men in scenarios of uncertainty.

De Villiers Scheepers, Boshoff and Oostenbrink (2018) examined how women's career and the values of Ubuntu (collectivist) related to their cognitive ambidexterity in seeking entrepreneurial initiatives in multicultural South Africa. In this study, the ambidexterity analysis was operationalized through causation and effectuation logics. For this purpose, we performed multiple regression and ANOVA analyzes from the answers of 309 valid questionnaires collected through a survey. The results revealed that Ubuntu's career, self-efficacy, and collectivism are important in women's ambitions. Mature and effective women in their final stages of life resort to their various networks and are characterized by a predisposition to acceptable losses and flexibility, inherent in effectuation logic, and to demonstrate aspects of causality in seeking entrepreneurial initiatives. In contrast, younger women, early in their careers, are more likely to use pre-agreements - an aspect of the effectuation approach - to secure stakeholder support.

In summary, although the literature presents studies about the relationship between the process of business creation and the gender, factors such as methodological weaknesses and sample size open a gap to seek to understand in greater depth the role of gender in the process of creating companies in light of the Causation and Effectuation approaches.

Sarasvathy (2001) proposed two approaches used by entrepreneurs to conduct business: the Causation and Effectuation approaches. Causation processes "take a particular given effect and focus on the selection between means to create this effect", therefore, based on decision analysis and planning (SARASVATHY, 2001, p 245). On the other hand, Effectuation processes "take a set of data media and focus on the selection between possible effects that can be created with this set of means" (SARASVATHY, 2001, p. 245), operating in a non-predictive logic, in which emerging strategies are applied to opportunities that arise during the entrepreneurial process (CHANDLER *et al.*, 2011; FAIA; ROSA; MACHADO, 2014). In summary, the Causation approach is based on causality and linearity, while the Effectuation approach is based on contingencies. Table 1 presents a comparison between these two approaches.

The Effectuation approach is composed of 4 dimensions: experimentation, acceptable losses, flexibility and pre-agreement. For Sarasvathy (2001) entrepreneurs are likely to experiment with different approaches in the marketplace before settling into a business. Thus, in the experimentation dimension, the Effectuation process can be seen as a series of experiments to identify a successful business model (CHANDLER et al., 2011).

Table 1 - Comparison between approaches

Categories of differentiation	Causation approach	Effectuation approach
Data	• The results are given.	• Some means and tools are given.
Criteria for decision making	• Helps to choose between means to achieve the given effect;	• Helps select between possible effects that can be created from given means;
	• Selection criteria based on expected returns;	• Selection criteria based on tolerable losses or acceptable risk;
	• Effect-dependent: choice of means is driven by the characteristics of the effect that the decision-maker wants to create and their knowledge of possible means.	• Actor-dependent: given specific means, the choice of effect is driven by the characteristics of the actor and their abilities to discover and use contingencies.
Skills employed	• Excellent in exploring knowledge.	• Excellent in exploring contingencies.
Context of relevance	• More present in nature;	• More present in human actions
	• More useful in static, linear and independent environments.	• Explicit assumption of dynamic, non-linear and ecological environments
Nature of what you cannot know	• Focus on predictable aspects of an uncertain future.	• Focus on controllable aspects of an unpredictable future
Central logic	• To the extent that we can predict the future, we can control it.	• To the extent that we can control the future, we do not need to predict it.
Results	• Market participation in existing markets through competitive strategies.	• New markets created through alliances and other cooperative strategies.

Source: free translation of Sarasvathy (2001, p. 251)

The second dimension presented by Sarasvathy (2001) is that of acceptable losses instead of the expected returns. In this case, the entrepreneur determines how much they are willing to lose and focuses on trying as much as possible within the predefined limits (SARASVATHY, 2001). Therefore, experiences that would cost more than the entrepreneur can lose are rejected in favor of acceptable experiences (CHANDLER et al., 2011).

The third dimension proposed by Sarasvathy (2001) is that entrepreneurs tend to be flexible, since the start-up structure depends on the contingent opportunities and the investments made by the interested parties. In the fourth dimension, entrepreneurs prefer to make pre-agreements and strategic alliances instead of stimulating competitiveness (SARASVATHY, 2001). The logic behind developing alliances and obtaining pre-agreements allows entrepreneurs to anticipate market movements by acting proactively. Thus, if entrepreneurs can control the future by establishing these relationships and agreements, they do not need to predict this (Chandler et al., 2011).

To measure these approaches, Chandler *et al.* (2011) proposed and validated a scale based on 20 items, with seven items for the Causation approach and 13 items for the four dimensions of the Effectuation approach. Chandler *et al.* (2011) also found that the Causation approach is negatively associated with uncertainty, while the experimentation dimension of the Effectuation approach is positively correlated with uncertainty.

Faia, Rosa and Machado (2014) related the degree of entrepreneurial alertness with the entrepreneurial approaches, regarding the exploration of emergent opportunities in a non-predictive (Effectuation) way. The survey had a sample of 123 entrepreneurs from different industries and used the scale validated by Chandler *et al.* (2011). The results indicated a positive relationship between entrepreneurial alertness and entrepreneurial approaches, especially for the Causation approach.

Reymen *et al.* (2015) used mixed methods to investigate strategic decision-making in the creation of new ventures. We analyzed 385 decision events in nine technology-based ventures. The results showed that business decision-making follows a "hybrid" logic that contains and combines both Effectuation and Causation elements. Thus, these findings also confirmed the expectations by Dew *et al.* (2011) that the Effectuation and Causation logics work simultaneously.

Laine and Galkina (2017) also identified this "hybrid" logic of association of the two approaches in Russian small and medium enterprises. It was found that while these companies use both approaches in decision making simultaneously, increased institutional uncertainty contributes to the increase of the Effectuation approach. The results indicated that the intensity of both types of decision logic varied over the period studied according to the change in the perception of institutional uncertainty.

By relating gender and the process of entrepreneurship, Frigotto and Della Valle (2016) found that men are more likely than women are to make decisions under uncertainty in "effectual" terms. It was observed that gender measured the perception of negative consequences through different levels of access to information and overconfidence.

The next section presents the materials and methods used to verify the relationship between gender and creation and how micro entrepreneurs operate in the city of Nova Cruz/RN.

3. MATERIALS AND METHODS

3.1 Sample and collection instrument

The subjects of the survey were the entrepreneurs registered as Individual Micro Entrepreneurs (MEIs) in the city of Nova Cruz/RN. Information from micro entrepreneurs was obtained from the Municipal Tax Office. For reasons of research ethics, in the opportunity to obtain the data, a term of commitment was signed, protecting the use of information for academic purposes only.

The population of individual micro entrepreneurs in the city in the year 2016 comprised of 1,030 individuals. For the accomplishment of this research, the sample calculation was estimated to obtain a probabilistic sample with 95% confidence level. The result indicated that the minimum probabilistic sample would be 88 individuals. Due to obstacles such as a database with some outdated contact information, refusal of individuals randomly assigned to respond to the survey, and difficulties in scheduling, 284 attempts (draw without replacement) were required to obtain 100 valid questionnaires. Data collection was carried out in person and by telephone between April and August 2016. Due to difficulties in getting agenda with the individuals drawn, some respondents were prepared to answer the questionnaire by telephone. Thus, due to the possibility of differences caused by the collection form, we used the Student's t test to compare if there were statistically significant differences between the samples collected in person and via telephone, as recommended by Hair *et al.* (2005). The null hypothesis tests equality of the two averages (HAIR *et al.*, 2005). The results were very similar in terms of parameters, with average difference of -0.0489 and with no difference between the variables being statistically significant. Thus, it is not possible to reject the null hypothesis that the parameters are the same when considering the form of collection.

For the detection of Outliers, we performed the residue analysis under the standardized and studentized perspectives, using the Bonferroni correction (ANGRIST; PISCHKE, 2008). Outliers usually have high residuals, but this is not characterized as a rule, given the possibility of attracting the forecast line to their surroundings, which may make them difficult to identify. Thus, the analysis of standardized residues presents a necessary but not sufficient condition for their identification (ANGRIST; PISCHKE, 2008; WOOLDRIDGE, 2010). One of the possibilities to overcome this barrier is to run a regression without the proposed outlier and to compare the predicted y value of this regression with the observed y value. The difference between û is called studentized residue (ANGRIST; PISCHKE, 2008).

As it is initially sought to find the distant outlier, it would not be legitimate to use only the t-test, since it is expected that 5% of the studentized residuals are higher than t.025 ±

2. For this, we used the Bonferroni correction in the *t* test, since the *p-value* of the farthest outlier is defined as $p = 2np$ ', where p' is the unadjusted value of the p-value of a t-test with n- 2 - k degrees of freedom. The mechanism consists in the creation of a dummy variable that would effectively absorb the observation considered an outlier and therefore, comparing the averages, then removing its influence in the determination of the other coefficients in the model (ANGRIST; PISCHKE, 2008; WOOLDRIDGE, 2010). Residuals that exceed the critical value t ($\approx \pm 2$) for a bilateral test at the $\alpha = 0.05$ level, after the Bonferroni correction, can be considered *outliers.* After this analysis, no observation was considered as outlier.

As for the instrument of data collection, we used a questionnaire with 39 closed and semi-structured questions. In the first section (Part A), the personal profile of the entrepreneur was raised. The second section (Part B) consisted of questions about the company profile. The last section (Part C) of the instrument presents the variables related to the Causation and Effectuation approaches, based on the scale developed by Chandler *et al.* (2011) and already used in Brazil by Faia, Rosa and Machado (2014), in which a 7-point Likert scale was used, varying from "totally disagree" to "totally agree". All aspects and issues addressed in the collection instrument were set out in Table 2.

3.2 Control Variables

Previous studies have pointed out that some characteristics are associated with the way individuals undertake business ventures. The literature demonstrates that the perspectives of undertaking business ventures Causation and Effectuation are associated with variables such as family background (SHAO, 2012; MEULENBROEK, 2014; POT, 2014); enterprising friends (FALCK; HEBLICH; LUEDEMANN, 2010; LAFORTUNE; PERTICARÁ; TESSADA, 2013), characteristics of the person such as level of education (HARMS; SCHIELE, 2012; MÄKIMURTO-KOIVUMAA; PUHAKKA, 2013), age (SHAO, 2012; FRIGOTTO, 2016) and economic factors, as well as the capital used to open a new business (GREENSLADE-YEATS, 2016).

Table 2 - Issues addressed by the Collecting Instrument

Aspect	Issues
(A) Entrepreneurial profile	(1) sex; (2) age group; (3) age you started to undertake; (4) number of children; (5) marital status; (6) level of schooling; (7) occupation of the parents before starting the business; (8) occupation of the parents after starting the business; (9) the existence of an enterprising relative; and (10) existence of enterprising friends before starting the business.
(B) Company Profile	(11) the year the company was established; (12) segment; (13) origin of the initial resources; (14) how the company was established; (15) annual revenue; (16) if there was assistance from third parties; (17) if so, who helped; and (18) if any support is currently received; (19) if so, what kind of support.
(C) Causation	(20) I analyzed the long-term opportunities and selected those on which I thought to offer the best return; (21) I developed a strategy to better take advantage of available resources and capabilities; (22) I developed a business plan; (23) I organized and implemented control processes to make sure that the pre-established objectives are met; (24) I researched and selected the target markets and conducted a significant competitive analysis; (25) I had a clear and consistent view of where I would like to go; and (26) I developed a marketing plan and a production plan.
(C) Effectuation (Experimentation)	(27) Before setting up my current business I tried different products and business models; (28) The product/service offered now is essentially the same as that originally intended; (29) The product/service offered now is quite different from that imagined first; and (30) I tried a number of different paths until I found a business model that worked.
(C) Effectuation (Acceptable losses)	(31) I was careful not to commit resources beyond what I was willing to lose (calculated risks); (32) I was careful not to risk more money than I was willing to lose with the initial idea; and (33) I was careful not to risk so much money as to put the company in financial trouble if things did not work out.
(C) Effectuation (Flexibility)	(34) I allowed the business to develop emerging opportunities (new ideas) beyond what was planned; (35) I adapted what we were going to do to the resources that I had available; (36) I was flexible and took advantage of opportunities as they arose; (37) I avoided actions that restricted the flexibility and adaptability of the business.
(C) Effectuation (Pre-Agreement)	(38) I have used various agreements with clients, suppliers and other organizations and individuals to reduce the chance of my business going wrong; and (39) I have used pre-agreements for customers and suppliers whenever possible.

Source: adapted from Faia, Rosa and Machado (2014).

In relation to the family background, its inclusion is justified by the possibility of intergenerational transmission of the entrepreneurial behavior (COLOMBIER; MASCLET, 2008; CHLOSTA *et al.*, 2012; HOFFMANN; JUNGE; MALCHOW-MØLLER, 2015; LINDQUIST; SOL; VAN PRAAG, 2012; WYRWICH, 2015). The literature points out that growing up in a family where parents are entrepreneurs represents a particular context in which decisions are made (ALDRICH; CLIFF, 2003; CHLOSTA *et al.*, 2012). Entrepreneurial parents provide an information-sharing environment such as a demystified view of entrepreneurial activity, access to resource sources, and information on business opportunities (SHAO, 2012). Aldrich and Cliff (2003) developed a framework based on the perspective of family integration in the creation of new ventures. They postulate that factors such as resources, changes in family composition and norms, attitudes, and values held by families influence each other and in turn influence the process of entrepreneurship.

Among these perspectives, the possibility of Social Transmission of Entrepreneurial Behavior influences the way of undertaking from the viewpoint of the perspective of **Social Theory of Learning** (BANDURA, 2002), under which individuals could learn by observation and be influenced by the social coexistence, especially with their parents, which could affect their way of undertaking a business venture. These variables were included in Shao (2012) and Pot (2014) to control this effect, using variables that capture the parents' profession and schooling, as well as the individual's family income. Corroborating this view, Falck, Heblich and Luedemann (2010) argue that entrepreneurial behavior is the result of an individual's socialization identity, but that in addition to the influence of parents and relatives, it can be shaped by peers.

In relation to contact with other entrepreneurs, as friends, literature highlights some elements in which living with entrepreneurial peers can foster entrepreneurial behavior. Among them, we can mention: development of entrepreneurial skills, information about risk-taking and diffusion of opportunities (GREVE; SALAFF, 2003).

With regard to the resources used and the origin of the company establishment, the Resource-Based Theory highlights the fact that entrepreneurs who grow up in entrepreneurial families are more likely to be tied to their goals when they have to make business decisions (READ; SARASVATHY, 2005).

The dichotomous variable "aid from support agencies for entrepreneurship" has been included by traditionally entrepreneurial development organizations, such as SEBRAE, to support entrepreneurs in the business planning and design processes. Thus, we sought to verify if a relationship existed between this variable and the entrepreneurship approaches mentioned, and, if so, to avoid the bias of the omitted variable, which could represent unreliable values for the parameter of interest of the estimated regressions (WOOLDRIDGE, 2010).

Entrepreneurial profile variables such as age, entrepreneur education, marital status and number of children were inserted in this research due to the literature pointing out the characteristics of the profile of the entrepreneur in relation to the way of acting. Studies such as Shao (2012), Mäkimurto-Koivumaa and Puhakka (2013), Pot (2014) and Frigotto (2016) talk about these variables, which in this study play a role of control variables.

Table 3 presents the coding of the variable of interest (Gender) and control variables related to the entrepreneur profile and company profile.

3.3 Descriptive Statistics

Regarding the profile of the entrepreneurs, we verified that 42% of the sample is of the female gender. Regarding marital status, 76% are married, 6% are widowers, 8% are single and 10% are divorced. In relation to relatives and friends, it was observed that 16% of the fathers and 14% of the mothers had some business previous to that of the child, but in 51%

Table 3 - Description of Variables

Code	Description	Authors
gender	Gender: male (0) and female (1).	Deng, Wang and Alon (2011); Shao (2012); Frigotto, Della Valle (2016).
Age	Categorical variable for age.	Shao (2012); Lafortune, Perticará and Tessada (2013); Frigotto (2016).
Children	Continuous variable for number of children.	Shao (2012); Lafortune, Perticará and Tessada (2013).
marital_status	Marital status: single (0) and married (1)	Shao (2012)
higher_education	Educational level: does not have higher education (0) and has higher education (1)	Shao (2012); Harms and Schiele (2012); Mäkimurto-Koivumaa and Puhakka (2013); Pot (2014).
father_previous_occupation	Occupation of the father before starting the business: another field (0) and entrepreneur (1).	Dew et al. (2009); Harms and Schiele (2012); Shao (2012); Pot (2014).
mother_previous_occupation	Occupation of the mother before starting the business: another field (0) and entrepreneur (1).	Dew et al., (2009); Harms and Schiele (2012), Shao (2012); Pot (2014).
enterprising_relative	Existence of enterprising relatives: (0)	Dew et al. (2009); Harms and Schiele (2012); Shao (2012).
enterprising_friend	Existence of enterprising friends before starting the business: (0) does not have and (1) has.	Falck, Heblich and Luedemann (2010); Lafortune, Perticará and Tessada (2013).
initial_resources	Origin of initial resources: own resources (0) and third-party resources (1).	Pot (2014); Greenslade-Yeats, (2016).
family_business_establishment	Family business: no (0) and yes (1).	Shao (2012); Pot (2014).
initial_support	Has received support from some institution to start the business: no (0) and yes (1).	Included by the authors.

Source: elaborated by the authors.

of the cases there are some relatives who are also entrepreneurs. In relation to the entrepreneurial friends, the sample indicates that in 60% of the individuals, there is at least one enterprising friend. The average age of the entrepreneurs is approximately 32 years, and began their activities as entrepreneurs, on average, at the age of 27. In addition, the number of children was on average 1.61 and that only 16% of the sample has higher education in some area.

Regarding the company profile, we observed that 60% work in commerce or services and that 87% of them started the business with their own resources. As for the origin of the business, 43% came from opportunity, 44% from necessity and in 13% of cases, the business was already in the family. We also verified that 77% of the entrepreneurs had some assistance to open the business; however, only 52% continue to receive help from other institutions (such as SEBRAE) to guide the management of the business. Table 4 presents the descriptive statistics of Part C of the instrument, referring to the Causation and Effectuation approaches.

Regarding the average of the factors, the Causation dimension presented an overall average of 4.85 on the *Likert* scale. The other factors presented averages between 4.02 (Effectuation) and 5.76 (Effectuation - Losses), the latter having the highest average. It should be noted that correlations between variables can be found in appendix 1 of this manuscript. The next section will present the methods used by this study.

3.4 Methods of Analysis

Factor analysis is a technique of variable interdependence, whose main objective is to describe covariance relations between a determined group of variables in order to find directly unobservable factors and to explain their relation with observed data (LATTIN; CARROLL; GREEN, 2011). Each grouping of variables represents a construct separately. In principle, the research instrument for data collection was composed of the dimensions “Causation”, “Effectuation - experimentation”, “Effectuation - losses”, “Effectuation

Table 4 - Descriptive Statistics

Aspects	Variables	Average	Deviation Pattern	Variance
Causation	cau_20	5.58	1.87	3.497
	cau_21	5.17	21.275	4.526
	cau_22	4.69	2.394	5.731
	cau_23	4.68	2.214	4.901
	cau_24	4.65	2.266	5.138
	cau_25	5.46	1.951	3.806
	cau_26	3.75	2.267	5.138
Overall average - Causation		4.85		
Effectuation (Experimentation)	ef_27	4.03	2.528	6.393
	ef_28	5.59	2.075	4.305
	ef_29	2.72	2.356	5.552
	ef_30	3.77	2.449	5.997
Overall average – Effectuation (Experimentation)		4.02		
Effectuation (Losses)	ef_31	5.64	1.888	3.566
	ef_32	5.79	1.748	3.056
	ef_33	5.84	1.768	3.126
Overall average - Effectuation (Losses)		5.76		
Effectuation (Flexibility)	ef_34	5.47	1.93	3.726
	ef_35	5.86	1.781	3.172
	ef_36	5.97	1.592	2.534
	ef_37	5.475	1.86	3.461
Overall average - Effectuation (Flexibility)		5.69		
Effectuation (Pre-agreement)	ef_38	5.25	2.105	4.431
	ef_39	5.33	2.165	4.687
Overall average - Effectuation (Pre-agreement)		5.29		

Source: Results obtained by SPSS 19 and by Stata 14.

- flexibility" and "Effectuation - pre-agreement". We used factor analysis in order to validate the consistency of these factors as interdependent (HAIR *et al*., 2005).

From the factorial analysis, we performed a multiple regression analysis, trying to infer if there is a relationship between the entrepreneur's gender and the aspects mentioned above. As an internal consistency model of the items, we used the Cronbach's alpha, which is based on the average correlation between the items. The critical value adopted by Cronbach's Alpha was 0.6. Hair *et al*. (2005) assume that values equal to or greater than 0.6 can be assumed for exploratory research.

The multiple linear regression allows the analysis between a dependent variable and two or more independent variables, through the composition of a mathematical model. Thus, it allows finding a causal relation between the variables, estimating the values for the dependent variables from the linear combination of the independent variables (WOOLDRIDGE, 2010).

The data analysis procedures supported analyzes and discussion of the results to be presented in the next section.

4. ANALYSIS AND DISCUSSION OF RESULTS

4.1 Validity and Reliability of Factors

In order to estimate the consistency of the instrument, we used the measures of reliability and validity of the factors. Reliability represents the precision with which an indicator measures or is associated with a concept that is intended to represent. Validity is related to the representativeness of a concept based on a set of indicators designed to estimate it (HAIR *et al.,* 2005). Table 5 presents the results regarding the validity and reliability of the instrument.

The Cronbach's Alpha coefficient test was used to evaluate the reliability of the instrument, including its 5 indicators. The result was 0.7204, which is considered good for exploratory research, according to the criteria by Hair *et al.* (2005). Next, Cronbach's Alpha was estimated for each of the dimensions. The result, shown in Table 5, shows that the alpha values ranged from 0.5762 to 0.8292.

The Cronbach's Alpha of the fourth factor (Effectiveness - Flexibility) was close to the criterion of 0.6 recommended by Hair *et al*. (2005). However, some authors are flexible about this cut-off rule, given the sensitive nature of the index (CORTINA, 1993; SIJTSMA, 2009). Schimitt (1996), questions the acceptance limits of alpha, pointing out that in some cases, a relatively low alpha remains very useful for an analysis. This is due to the sensitivity of alpha to the number of elements in each factor, since an increase in the number of elements tends to increase the alpha, even if the correlation between the elements decreases, as shown by Cortina (1993). Not being a major issue in this article, this issue will not be widely discussed. However, further details can be found in Cortina (1993), Schimitt (1996) and Sijtsma (2009), which deal with distortions in the use of Cronbach's Alpha.

Thus, due to the theoretical relevance of the Effectuation - Flexibility construct, validated in articles such as Chandler *et al*. (2011); of the proximity of the value presented by Factor 4 alpha to the recommended level of 0.6; of the sensitivity analysis performed with and without factor 4, which did not present alterations that justified its elimination from the analysis, both in statistical significance and in relation to the magnitude of the variable of interest of the study; and by the consistency of the results found in the commonalities and self-value of the same, we chose to maintain Factor 4 (Effectuation-Flexibility) in the analysis.

When estimating the factor analysis, we considered the dimensions that presented eigenvalues above 1.0 (HAIR *et al.,* 2005; LATTIN; CARROLL; GREEN, 2011). The results corroborate the 5 factors pointed out by Sarasvathy (2001), validating the respective model. In addition, the total variation explained by the model was 70.19%. Regarding the adequacy of the sample, we used a Kaiser-Meyer-Olkin (KMO) measurement, obtaining a value of 0.645, considered satisfactory. We also performed the Bartlett sphericity test,

Table 5 - Variation explained, Alpha and eigenvalues of the Causation and Effectuation factors

Factor	Cronbach's Alpha	Self-value	Explained variation	Accumulated variation
Factor 1 – Causation	0.7744	3.26795	23.34%	23.34%
Factor 2 - *Effectuation* Losses	0.7737	2.25682	16.12%	39.46%
Factor 3 - *Effectuation* Pre-agreement	0.8292	1.66156	11.87%	51.33%
Factor 4 - *Effectuation* Flexibility	0.5762	1.56666	11.19%	62.52%
Factor 5 - *Effectuation* Experimentation	0.6492	1.07351	7.67%	70.19%

Source: Results obtained by Stata 14.

rejecting the null hypothesis that the correlation matrix of the variables is an identity matrix (HAIR *et al.,* 2005; LATTIN; CARROLL; GREEN, 2011). Thus, the analysis of main components presents robustness in the grouping of variables in the Causation factor, and in the factors related to the Effectuation perspective: Loss, Pre-agreement, Flexibility and Experimentation.

Table 6 presents the results of the rotational factor loadings and respective commonalities. In the analysis, we only kept factors with commonalities above 0.5 - as recommended by Hair *et al.* (2005) in applied social research. Only six of the 20 variables proposed by Sarasvathy (2001) were not consistent. The variables of questions 20, 24 and 25 (Factor 1 - Causation), 27 and 30 (Factor 5 - Effectuation Experimentation), and 37 (Factor 4 - Effectiveness Flexibility) were not used.

From the validation of the instrument through the factor analysis, 5 dimensions were extracted that were used as dependent variables in the regression models, aiming to associate the entrepreneur's actions (Causation and Effectuation approaches) and gender, controlling for variables listed in the literature.

4.2 Discussion of Results

The multiple regression models present a series of assumptions to be the best linear unbiased estimators (WOOLDRIDGE, 2010). To verify the assumption of absence of perfect multicollinearity, we performed the variance inflation factor (VIF) test, in which values close to 1 indicate low levels of collinearity (HAIR *et al*., 2005). In all models, the independent variables presented VIF mean of 1.65, and no variable exceeded the tolerable maximum limit of 5. On the verification of homoscedasticity, we performed the White test. The null hypothesis for this test is that the residue variance is constant (WOOLDRIDGE, 2010). All models had p-values above 0.41 and could not reject the null hypothesis of homoscedasticity. Finally, we verified the normality of the residues. Normality is important as it impacts the validity of all tests, including statistics t and f. In this case, it is assumed that the residues have normal distribution and constant variance, being independent of the predictor variables (WOOLDRIDGE, 2010). To verify this assumption we performed the

Table 6 - Rotated factor analysis matrix

Factors	Variables	Components					Commonalities
		1	2	3	4	5	
Factor 1 *Causation*	cau_22	0.818					0.718
	cau_26	0.762					0.606
	cau_21	0.753					0.641
	cau_23	0.692					0.740
Factor 2 *Effectuation* (Acceptable losses)	ef_32		0.864				0.777
	ef_33		0.795				0.740
	ef_31		0.793				0.655
Factor 3 *Effectuation* (Pre-agreement)	ef_38			0.919			0.869
	ef_39			0.871			0.813
Factor 4 *Effectuation* (Flexibility)	ef_35				0.842		0.777
	ef_34				0.675		0.574
	ef_36				0.516		0.515
Factor 5 *Effectuation* (Experimentation)	ef_29					-0.859	0.762
	ef_28					0.792	0.640

Source: Results obtained by SPSS 19.

Shapiro-Wilks test, whose null hypothesis is that the distribution of residues is normal. The results show that the null hypothesis of normality of the residuals cannot be rejected for all models.

Table 7 presents the results of the multiple linear regression estimates and the validation tests of the models. Five models were estimated, each of them having as dependent variable the factors of the causation and effectuation approaches. The variable of interest in the five models is the entrepreneurs' gender, and the other control variables are listed in Table 7.

Table 7 - Multiple linear regression

Independent Variables	Factor 1 Causation	Factor 2 Effectuation Losses	Factor 3 Effectuation Pre-agreement	Factor 4 Effectuation Flexibility	Factor 5 Effectuation Experimentation
Constant (β0)	-0.9689**	-0.061	-0.140	-0.222	-0.585
	(0.473)	(0.493)	(0.558)	(0.540)	(0.540)
Gender	0.3949**	0.212	0.045	-0.164	-0.069
	(0.196)	(0.218)	(0.246)	(0.239)	(0.238)
Age	0.01316***	0.004	-0.001	-0.003	0.015
	(0.107)	(0.011)	(0.012)	(0.012)	(0.012)
Children	-0.2298*	0.129***	0.069	0.090	0.024
	(0.0804)	(0.081)	(0.091)	(0.089)	(0.088)
marital_status	0.1283	0.140	-0.073	0.099	-0.115
	(0.232)	(0.231)	(0.261)	(0.253)	(0.252)
higher_education	0.1461	-0.103	-0.133	0.336	-0.594**
	(0.284)	(0.282)	(0.319)	(0.309)	(0.309)
father_previous_ occupation	-0.2415	0.731***	0.128	-0.348	-0.204
	(0.565)	(0.501)	(0.567)	(0.549)	(0.548)
mother_previous_ occupation	0.0608	-1.265**	-0.451	0.656	-0.079
	(0.611)	(0.622)	(0.703)	(0.681)	(0.680)
entrepreneurial_ relative	0.2352	0.107	0.239	0.471**	0.262
	(0.223)	(0.232)	(0.262)	(0.254)	(0.253)
entrepreneurial_ friend	0.072	0.256	0.138	-0.228	-0.007
	(0.221)	(0.216)	(0.245)	(0.237)	(0.237)
initial_resources	0.215	-0.712*	0.373	-0.463***	0.011
	(0.291)	(0.293)	(0.332)	(0.321)	(0.321)
business_ opportunity_ establishment	0.2813	0.069	-0.118	-0.043	0.174
	(0.224)	(0.223)	(0.252)	(0.244)	(0.244)
family_business_ establishment	#CAMPO!	0.452***	0.052	-0.480***	-0.307
	(0.312)	(0.310)	(0.351)	(0.340)	(0.339)
initial_support	0.5483**	-0.007	0.013	0.149	0.074
	(0.238)	(0.237)	(0.268)	(0.259)	(0.259)
Observations	100	100	100	100	100
R Square (R^2)	26.7%	27.4%	7.1%	12.9%	13.1%
White (homoscedasticity)	0.4678	0.4494	0.4635	0.9606	0.4103

Shapiro-Wilks (normality of residues)	0.1255	0.6164	0.01412	0.1345	0.03745
* Significant variables at 10%. (t > 2.364)					
** Significant variables at 5%. (t > 1.660)					
*** Significant variables at 1%. (t > 1.290)					

Source: results obtained by SPSS 19 and Stata 14.

Model 1 presents the Causation factor and the dependent variable. The coefficient of explanation of the model (R^2) was 26.7%. In this estimation, the variable "gender" was statistically significant at 5% and with a parameter value of 0.3949, demonstrating a positive association between the female gender and the conception of a business following the Causation paradigm. This result can be explained by behavioral characteristics associated with gender in the decision-making process. Women are more likely to seek additional information and spend more time on planning and decision making, factors associated with the characteristics of the causal perspective (SHAO, 2012; JISR; MAAMARI, 2014; DE VILLIERS SCHEEPERS; BOSHOFF; OOSTENBRINK, 2018). Deng, Wang and Alon (2011) argue that they have a greater propensity to set realistic goals in the process of undertaking business ventures, as well as being oriented to long-term plans, which are associated with causal logic. In addition, Frigotto and Della Valle (2016) point out that in situations with little knowledge about the entrepreneurial activity, women would be more prone to causal logic given the greater risk aversion on the part of the entrepreneurs.

The control variables "age", "number of children" and "support of some entrepreneurship promotion agency" also obtained statistically significant parameters, being "age" and "support of institutions of foment to the entrepreneurship", presenting positive effects, and "number of children", negative effect.

Regarding age, the variable was statistically significant only in the first model, losing statistical significance in the other estimates, which are associated with the Effectuation approach. It should be noted that, according to the model, an age one year greater would increase by approximately 0.013 units in the Causation factor. According to Frigotto and Della Valle (2016), the variable "age" is a proxy for the accumulated knowledge and greater possibility of access to the capital. Thus, the greater the age of the individual, the greater possibility of having resources available, as well as a deeper understanding of the business planning process, characteristics associated with causal logic.

The variable "number of children" presented a negative and statistically significant relation with the causal dimension (Model 1). Thus, the increase of 1 child would decrease the Causation factor by 0.22 units. The literature points out that in the process of creating companies, women who have children seek flexible hours search and the possibility of reconciling work and family life (MACHADO; GALOZA; AÑEZ, 2013). In this way, individuals who have children would be less prone to causal logic, being more likely to approach effectuation, which presents a contingency character and greater flexibility of the approach, with aversion to losses as a central element related to the Effectual process. Particular attention is drawn to the fact that such variable presented a positive signal in the estimation of Model 2, associated with the variable "acceptable losses", of the Effectuation approach.

It should be noted that the variable "support from development institutions" presented a parameter of 0.548, being the largest parameter of model 1. Such a variable had not been included in previous studies dealing with how to undertake a business venture. The non-inclusion of this variable in regression models could bias the parameter of interest of the study (WOOLDRIDGE, 2010). It is believed that the causal, linear and focused nature of the Causation approach (SARASVATHY, 2001) is in line with the support given by such institutions to entrepreneurs, usually focused on Strategic Planning and Business Plan.

The second estimation (Effectuation dependent variable) presented a 27.4% R^2, the control variables "number of children" and "entrepreneurial parent" were statistically significant and presented positive effects.

In relation to the number of children, we highlight that the result found was positive and statistically significant at 1%. Thus, the increase of a child would be associated with an increase of 0.013 units in the "Acceptable Losses" Factor. This dimension is composed of questions associated with tolerance of losses of individuals, with questions such as "I was careful not to commit resources beyond what I was willing to lose (calculated risks)" and "I was careful not to risk more money than I was willing to lose with the initial idea ". In this way, individuals who have children have a lower tolerance to take risks, since they demand more capital to provide their offspring, as well as changes in the expectation of future expenses (BROWNE; JAEGER; RICHTER; STEINORTH, 2016). In addition, Gorlitz and Tamm (2015) point out that paternity changes considerably the risk aversion of an individual, varying according to the age of the children. The authors argue that the apex of aversion is reached shortly after the birth of the child, with this effect diminishing over the years, and thus its impact is a second-degree function.

The variable "entrepreneurial parent" presented a positive and statistically significant parameter. Studies such as Chlosta et al. (2012) and Lindquist, Sol, and Van Praag (2015) indicate a Social Transmission of Entrepreneurial Behavior in which individuals who are children of entrepreneurs will inherit entrepreneurial skills and beliefs from their parents. Markussen and Roed (2017) still point gender homophily in the transmission of entrepreneurial behavior in the case of father and son. Thus, male children would tend to replicate the behavior of the father, a hypothesis also pointed out by Hacamo and Kleiner (2018). Thus, children of an entrepreneurial father would inherit techniques of management and access to capital (DUNN; HOLTZ-EAKIN, 2000; PARKER, 2009), as well as previous experiences (COLOMBIER; MASCLET, 2008; WYRWICH, 2015), making them more informed and less likely to take uncalculated risks.

The variable "entrepreneurial mother" was statistically significant and with a negative sign. The literature points out that women are more risk-sensitive (SHINNAR; GIACOMIN; JANSSEN, 2012). Thus, in the face of the Social Transmission of Entrepreneurial Behavior (CHLOSTA *et al.,* 2012; LINDQUIST; SOL; VAN PRAAG*,* 2012) and Social Learning Theory (BANDURA, 2002), children of entrepreneurial mothers could be less forgiving of losses by conveying their perspectives of entrepreneurial behavior. Frigotto and Della Valle (2016) still argue that women would be more affected by acceptable losses than men, and this is a possible justification for the difference of signs between the effect of the entrepreneurial father and the entrepreneurial mother on the second factor.

Finally, the variable "third-party resources at the beginning of the business" had negative effects, demonstrating that when using third-party resources and the mother having previous experience in entrepreneurship influence, the greater prudence in the use of resources and loss aversion (DEW *et al*., 2009; HARMS; SCHIELE, 2012; POT, 2014). This may be associated with family normative support in terms of financial and non-financial resources needed to launch a business, learning effects, prior experiences, knowledge and perceived behavioral control (CARSRUD *et al*., 2007).

The third model did not present statistically significant variables, with a coefficient of explanation of only 7.1%, demonstrating that the variation of the pre-agreement variable is apparently not explained by gender and other control variables.

The fourth regression, which has the Effectuation-Flexibility perspective as a dependent variable, had a R^2 coefficient of 12.9%, with the variables "initial third-party resources" and "business founded by the family" being statistically significant at 1% and negative values, obtaining the values -0.463 and -0.480, respectively.

In relation to third-party funds, the parameter may have had negative effects, it may be associated to the fact that the indebtedness with third-parties generate an increase in the sensation of risk when undertaking a business venture (HERRANZ; KRASA; VILLAMIL, 2015), providing less flexibility in the management of the business with these groups of entrepreneurs acting in a perspective less dynamic and contingent than the groups that founded the own business and used own resources (POT, 2014).

With regard to the family origin of the business, it is highlighted that social interactions and the psychological development of family relationships in business are impacted by the perception of independence, autonomy and freedom of ownership of family businesses (JIRS; MAAMARI, 2014). In this way, the family influence of previous generations could reduce the flexibility of management. The results of model 1 indicated a positive relation between age and the causal approach, endorsing this perspective.

The variable "entrepreneurial relative" was considered statistically significant at 5% and with a parameter of 0.471, demonstrating a positive association between having a relative who performs business activity and the flexible management performance. The main arguments for this are the transmission of information on new business opportunities and the reduction of uncertainty associated with entrepreneurship (FALCK; HEBLICH; LUEDEMANN, 2012; FIELD *et al.*, 2016), which would bring more information in the decision-making process, allowing a greater scope of action on the part of the entrepreneurs.

The fifth model, related to the Effectuation-Experimentation factor, had only the variable "higher education" as statistically significant, presenting a negative sign. It is worth noting that this factor was composed of questions 28 (The product/service offered now is essentially the same as that originally thought) and 29 (The product/service offered now is quite different from the one imagined first). One hypothesis is that entrepreneurs with higher education kept their products similar to the initial planning because the average of question 28 was 5.59, representing more than twice the average of the answers in question 29. This result corroborates the effect found by Mäkimurto-Koivumaa and Puhakka (2013).

4.3 Sensitivity and Robustness Analysis

The initial results pointed to an association between the female gender and the Causation approach. To support the methodological consistency of this finding, we performed a robust regression estimation (*MM-Regression*). Robust regression is a form of regression analysis designed to circumvent some of the limitations of traditional parametric methods. Such a technique presents itself as a complementary method to classic multiple regression, since its estimation combines a high resistance to outliers and high efficiency in regression models with normal errors (VERARDI; CROUX, 2008). From the results found by the regressions in Table 6 - which indicated association between gender and the Causation approach - robust regression estimates were performed for the model that has Factor 1 (Causation) as the dependent variable. Table 8 presents the sensitivity analysis of the robust regression estimation for the Causation factor.

The results indicate that the female gender showed a positive association with the Causation approach. In the six robust regression models estimated, the parameter of interest Gender varied from 0.572 to 0.653, being significant in all the estimated models. The results point to a low sensitivity of the model, regarding the association between female gender and the Causation approach. When considering the control variables, Number of children, Initial support, Entrepreneurial mother, simultaneously entrepreneurial father and mother were presented as statistically significant.

It is noteworthy that using the robust regression technique, the variables related to the parents' entrepreneurial background had a statistically significant effect with respect to the Causation approach. The variable Entrepreneurial mother presented positive sign in all six

Table 8 - Sensitivity Analysis (Robust Regression)

Variables	(1) Model Robust	(2) Model Robust	(3) Model Robust	(4) Model Robust	(5) Model Robust	(6) Model Robust
gender	0.628***	0.624**	0.652**	0.653**	0.588**	0.572***
	(0.222)	(0.253)	(0.271)	(0.279)	(0.224)	(0.209)
age	0.0150*	0.0183	0.0187	0.0191	0.0146	0.0121
	(0.00760)	(0.0122)	(0.0130)	(0.0133)	(0.0188)	(0.00788)
children	-0.313***	-0.343**	-0.353***	-0.352**	-0,303*	-0.283**
	(0.0761)	(0.133)	(0.127)	(0.139)	(0.179)	(0.108)
initial_support	0.509**	0,425	0,463*	0,462*	0.512**	0.515***
	(0.254)	(0.261)	(0.236)	(0.246)	(0.218)	(0.195)
family_business_ establishment	-1.063***	-1.010***	-1.004***	-1.016***	-0.977***	-0.993***
	(0.333)	(0.274)	(0.283)	(0.273)	(0.361)	(0.338)
entrepreneurial_relative	0.418**	0.484*	0.471*	0.486*	0.421	0.326
	(0.206)	(0.267)	(0.264)	(0.257)	(0.385)	(0.215)
mother_previous_occupation	1.354***	1.569***	1.604***	1.647***	1.607***	1.538***
	(0.177)	(0.236)	(0.243)	(0.197)	(0.252)	(0.176)
fatherandmotherentrepreneurs	1.695***	3.042***	3.003*	3.027*	2.775	1.631***
	(0.537)	(0.978)	(1.681)	(1.525)	(5.675)	(0.308)
father_previous_occupation	-0.306	-1.468	-1.415	-1.396	-1.094	
	(0.444)	(0.936)	(1.642)	(1.462)	(5.469)	
initial_resources	0.396	0.370	0.382	0.391		
	(0.284)	(0.344)	(0.328)	(0.341)		
marital_status	0.182	0.0604	0.0603			
	(0.172)	(0.189)	(0.193)			
proven_higher_education	0.185	0.167				
	(0.210)	(0.313)				
entrepreneurial_friend	-0.265					
	(0.190)					
Constant	-0.531	-0.635	-0.661	-0.643	-0.499	-0.402
	(0.349)	(0.403)	(0.446)	(0.474)	(0.604)	(0.349)
Observations	100	100	100	100	100	100

* Significant variables at 10%. (t > 2.364)

** Significant variables at 5%. (t > 1.660)

*** Significant variables at 1%. (t > 1.290)

Source: results obtained by SPSS 19 and Stata 14.

estimates, varying between 1.354 and 1.647. We have included in the analysis the interactive term for the situation in which father and mother are simultaneously entrepreneurs. This term presented a positive sign, with a statistically significant parameter in 5 of the six estimates. The beta ranged from 1.631 to 3.042. Consider the case of an individual who has an entrepreneurial father and mother simultaneously. This means that, considering the first model, the effect of their parents being entrepreneurs in their propensity for the Causation approach is 3.049, resulting from the sum of the parameters Entrepreneurial mother and Entrepreneurial father and mother (1.695) + (1.354)]. Due to the empirical evidence of the entrepreneurial mother in the propensity to the Causation approach.

The intergenerational transmission of entrepreneurial behavior through the Social Learning Theory (BANDURA, 2002) can help us explain this result. Assuming that children of entrepreneurs have been exposed to a unique learning environment about business

activity, having contact with business processes, they can compose their business decision making process differently from those individuals who do not have entrepreneurial parents (CHLOSTA *et al.*, 2012; LINDQUIST; SOL; VAN PRAAG, 2012). In general, this result denotes the possibility that practices associated with the causal perspective, such as long-term planning and results-oriented vision, can be transmitted to the offspring, influencing how the next generations make their own entrepreneurial decisions (PEARSON; CARR; SHAW, 2008; SHAO, 2012; POT, 2014).

The robust sensitivity and regression analysis for the Effectuation approach were also estimated. However, the models did not show any association with gender at the heart of this research.

5. CONCLUSIONS

This research had as its objective to analyze if gender influences the performance of micro entrepreneurs in light of the Causation and Effectuation approaches. The results demonstrate a positive and statistically significant association between the female gender and the Causation perspective, in agreement with the literature (DENG; WANG; ALON, 2011; SHAO, 2012; JISR; MAAMARI, 2014; FRIGOTTO; DELLA VALLE, 2016; DE VILLIERS SCHEEPERS; BOSHOFF; OOSTENBRINK, 2018). When estimating models of robust regression, the fact that an individual has an entrepreneurial mother fosters the propensity to think Causation, which could corroborate the association between the female gender and such an approach. The analyzes of the models 2 to 5, referring to the Effectuation perspective, did not present associations statistically significant in relation to the gender. The variables "age", "number of children" and "initial support of entrepreneurship promotion agencies" presented statistically significant results for the "Causation" perspective, with "age" and "initial support", negative. It should be noted that "age" was statistically significant for the Causation approach, while in Frigotto (2016), it was found to be associated with the Effectuation approach.

From the point of view of the Effectuation approaches, the Losses dimension, the variables "Number of children", "Family business foundation" and "Entrepreneurial parent" presented positive and statistically significant effects, and variables "Entrepreneurial mother" and "Initial resources" presented negative and statistically significant effects. Regarding the Flexibility factor, the fact that a business has obtained third-party financing and was founded by the entrepreneur's family, reduces the flexibility in managing the business. With regard to Experimentation, only Education presented a statistically significant and negative relation, with the upper level holders maintaining little changed the initially conceived products/services. Variables such as "Has an entrepreneurial friend", "Marital status" and "Foundation of business by opportunity" had no association with the ways of undertaking a business venture.

From an academic point of view, this article advances in the literature by empirically demonstrating the association between gender and business creation, which, in addition to being a poorly discussed relationship in the literature, corroborates Perry, Chandler and Markova's (2012) proposal of advancing to an intermediate state. In addition, the research demonstrates results to enrich the debate about the pertinence of variables associated with the way of creation and development of business. The study also contributes to the literature by finding empirical evidence of the association between the Causation approach and the support of entrepreneurship promotion agencies in business design.

As practical contributions, the results help entrepreneurship promotion agencies and entrepreneurship education units to understand gender-specific particularities and attitudes

in the process of starting a business. This makes it possible to create training policies and entrepreneurial training courses by gender, allowing a potential optimization of results.

As limitations, it is emphasized that although the sample is probabilistic, generalizations must be parsimonious, since the study has as subjects a specific legal personality of entrepreneurs, as well as having been carried out in a single municipality. From the theoretical point of view, the incipient character of the literature regarding the association between gender and the way of undertaking a business venture is highlighted, which imposed considerable barriers in the identification of the causes associated with the findings. In addition, the objective of the study contemplated the identification of the relationship between such variables, only initiating the debate on the substantive elements present in this relation. In addition, considering only one of the 21 possibilities of categorizing gender cataloged (Binary Gender) for motives of operational research and for the literature to treat commonly gender from the perspective of gender of birth, the study is limited only to this perspective.

Given the above, we suggest as future studies considering the other perspectives of gender, expanding the scope of discussion not only to the perspective of gender binary at birth of individuals. Due to the epistemological and methodological boundaries delimited in this article, we suggest to carrying out qualitative studies that seek to deepen the association of gender with the way of undertaking a business venture, thus strengthening the theoretical corpus of the thematic. In addition, we recommend conducting comparative studies with samples amplified in other regions of the country, considering socio-cultural and economic characteristics as control variables. We also suggest that the relationship between "support of promotion agencies to entrepreneurship" and business creation, be investigated with greater depth, given the results found in this research.

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APPENDIX 1

Table 9 - Correlations between variables

Variables	Gender	Children	Initial support	Enterprising father and mother	Previously enterprising mother	Proven higher education	Marital status	Enterprising relative	Enterprising friend	Necessary business establishment
Gender	1									
Children	-0.0261	1								
initial support	0.0318	-0.132	1							
Father and mother entrepreneurs	0.213	0.0727	-0.00070	1						
Previously enterprising mother	0.241	0.0335	0.0151	0.958	1					
Proven higher education	0.177	-0.148	0.0164	-0.0887	-0.0926	1				
Marital status	-0.0911	0.273	-0.0846	0.0780	0.0243	-0.0859	1			
Enterprising relative	0.186	0.0142	-0.0128	0.141	0.165	0.0413	0.0581	1		
Enterprising friend	-0.0496	0.153	-0.00970	0.134	0.153	0.0937	0.163	0.302	1	
Necessary business establishment	0.103	0.0828	0.00570	0.137	0.165	-0.0185	0.0264	-0.300	-0.0576	1
Factor 1 – Causation	0.185	-0.296	0.260	-0.00890	-0.0159	0.204	-0.0589	0.114	0.0399	-0.0908
Factor 2 - Effectuation Losses	0.0412	0.110	-0.0736	-0.273	-0.328	0.164	-0.00180	0.0507	0.0548	-0.111
Factor 3 - Effectuation Pre--agreement	0.0406	0.116	0.00310	0.0435	0.0199	-0.0962	0.000700	0.147	0.0905	-0.0102
Factor 4 - Effectuation Flexibility	-0.00950	0.0669	0.0277	0.106	0.105	0.125	0.0656	0.199	0.0175	0.0241
Factor 5 - Effectuation Experimentation	-0.0694	0.0631	0.0156	0.139	0.140	-0.0244	-0.0194	0.0938	0.0172	-0.0194

Source: Results obtained from Stata 14®. (2018)