A Cultural Value Approach to the Entrepreneurial Gender Gap across 45 Countries — using a multilevel logistic model of individual entrepreneurial activity

Master of Science Thesis in the field of drivers of individual entrepreneurs
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Abstract

This research explains the entrepreneurial gender gap by focusing on the normative environment within the institutional context of countries. The normative environment shapes a society's individuals' collective programming of the mind and develops individuals' entrepreneurial behavior through values and beliefs, attitudes, and stereotyped expectations. Literature is inconclusive on whether the cultural values power distance, individualism, masculinity and uncertainty avoidance known to influence the entrepreneurial activity of individuals within a society are diverging in their effect on female and male entrepreneurial activity. This paper contributes to diminishing the dearth of studies using inappropriate models for cross-cultural empirical analysis by using an appropriate multilevel model to investigate the theoretically substantiated effects. The hypotheses are empirically explored using data from Hofstede, Global Entrepreneurship Monitor 2016, and The World Bank 2015 across 45 countries. Cross-level interaction terms are used to explain the moderating effect of a society's cultural values and beliefs proxied by Hofstede's cultural dimensions on the negative and statistically significant relationship between being female and being involved in entrepreneurial activity. The estimates of the cross-level interaction terms between country-level variables power distance, individualism, uncertainty avoidance, and masculinity and individual-level variable gender show weak or insignificant associations. Nevertheless, it is concluded that to increase female entrepreneurial activity and close the entrepreneurial gender gap, academics, policymakers, and policy implementers need to anticipate more on the socio-cultural context that forms the institutionalized values and beliefs societies have regarding gender roles. This needs to be done using appropriate multilevel models incorporating individual level and country level variables.

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1. Introduction

Despite the worldwide attention given to gender inequality, the entrepreneurial gender gap and the promotion of female entrepreneurship, gender inequality still exists and subsequently entrepreneurship remains a male-dominated endeavor (Dheer et al., 2019; Bosma et al., 2020; United Nations, 2019). Women-owned businesses make significant contributions to innovation, employment and wealth creation in all economies (Minniti, 2009). The proven contribution of female entrepreneurship to economic and societal development makes the gap between men- and women-owned businesses an untapped potential (Dheer et al., 2019). Closing this gap could advance economic growth and social development in nations around the globe (Brush & Cooper, 2012). Therefore, realizing the importance of gender equality with regard to entrepreneurial activity is critical and dwelling upon its determinants and its main causes is necessary in order for academics, policy makers, and policy implementers to design and offer effective and supportive policies and programs for the development of women-owned businesses in order to attempt and close the worldwide gap once and for all.

Previous research shows that culture defined as a society's collective programming of the mind affects the entrepreneurial activity of females (Bullough et al., 2017; Shinnar et al., 2012). Previous research also shows that the cultural dimensions power distance, uncertainty avoidance, masculinity, and individualism are particularly important for the understanding of a country and its individuals entrepreneurial activity in general (Hayton et al., 2002; Hofstede et al., 2004; Hunt & Levie, 2002; McGrath et al., 1992; Mueller & Thomas, 2001; Shane, 1992, 1993). However, the two research streams have not yet been combined. Therefore, this research explores the effects of national cultural practices on female entrepreneurial activity. It shows the important implications necessary to understand the effect of countries' cultural dimensions on female entrepreneurial activity. In addition, this paper provides a theoretical framework of the relationship between the cultural dimensions and female entrepreneurial activity to answer the research question: *"How do the cultural dimensions power distance, uncertainty avoidance, masculinity, and individualism characterizing a society's collective programming of the mind affect female entrepreneurial activity?"*

This paper builds on the stream of literature that elaborates on entrepreneurship as a creative human process and on the stream of literature that attempts to explain the entrepreneurial gender gap. In addition, it builds on the stream of literature that explains culture as the collective programming of the mind and how it affects entrepreneurial activity. Lastly, it builds on literature that explains the effect of culture as a broader concept on female entrepreneurship. Eventually, while building upon these four literature streams, the theories

developed in the existing literature are combined to hypothesize about the effects of Hofstede's cultural dimensions power distance, individualism, uncertainty avoidance and masculinity on countries' female entrepreneurial activity.

The research question is empirically investigated by using a multilevel logistic regression model while controlling for country-level economic factors and individual-level socio-demographic and perceptual factors. By using a multilevel model this research contributes to diminishing the dearth of studies that explore the effects of national cultural practices on female entrepreneurial behavior while using appropriate research designs. The multilevel model incorporates individual level and country level variables and deviates from the majority of entrepreneurship research using micro- or macro-level models. Micro-level models often ignore the role of context in shaping an individual's motivation and decision for entrepreneurship (Autio et al., 2013). Contrary, macro-level models often overemphasize the role of context and ignore the impact of micro-level variables (Autio et al., 2013). Ignoring the multilevel structure of data can result in biases in parameter estimates and might lead to an underestimation of their standard errors. By using a multilevel model, these important weaknesses are addressed.

The results of the multilevel models support the hypothesis that across nations females are less likely to engage in entrepreneurial activity. The hypotheses on the moderating effects of the cultural dimensions on this relationship are not supported. The estimation results show that a country's level of power distance has a positively moderating effect and a country's level of individualism has a negatively moderating effect on females being involved in entrepreneurial activity. The estimation results for the cross-level interaction terms including masculinity and uncertainty avoidance turn out insignificant. The regression results are unexpected and can be refuted by arguments in literature. This ambiguousness regarding inferences is not rare in the research stream investigating the effect of culture on individuals' entrepreneurial activity using cross-national data (Çelikkol et al., 2019). Even though the results show no congruent evidence for the hypotheses, this research stresses the importance of the use of a multilevel model when investigating how the sociocultural context in which individuals are embedded impacts individuals' decision regarding entrepreneurial activity.

Entrepreneurship research embraces numerous perspectives, takes place along different dimensions of context, and analyses are carried out at various levels (Welter, 2011). Setting the boundaries of the domain for a study contributing to the broad literature stream of the concept entrepreneurship is challenging. This research investigates the impact of countries' societies' collective programming of the mind on female entrepreneurial activity using a multilevel

logistic model for the empirical analysis. Therefore, this paper focuses on countries' normative environment within the institutional context. It contributes to the strand of literature studying the influence of a society's normative environment on the entrepreneurial gender gap using multilevel analysis.

The paper is structured as follows. Section 2 provides a literature review on the determinants of individual entrepreneurial activity and the entrepreneurial gender gap. In addition, the section contains the theoretical framework leading to five hypotheses. Section 3 describes the data and the method used to answer the research question. Section 4 presents the regression results, analyses and robustness checks. Section 5 presents the conclusion and discussion of this research including its limitations, implications for practice, and suggestions for future research.

2. Literature review and hypotheses development

This section provides an overview of the literature on entrepreneurship as a creative human process, the entrepreneurial gender gap and its determinants, culture as collective programming of the mind influencing a society's entrepreneurial activity, and the role of culture shaping the gender roles and stereotypes not in favor of female entrepreneurial activity. Furthermore, this section puts forward a hypothesis predicting the relationship between being female and being involved in entrepreneurial activity. Thereafter, it elaborates on the characteristics of the cultural dimensions power distance, individualism, masculinity, and uncertainty avoidance and four hypotheses are formed about their moderating effect on the relationship between being female and being involved in entrepreneurial activity. Figure 1 displays the conceptual model belonging to Hypotheses 1, 2, 3, 4, and 5.

2.1. Literature review and background

2.1.1. Entrepreneurial activity

Entrepreneurship is a complex social behavior for which literature provides a diverging set of definitions.[1] Entrepreneurship as a multifaceted phenomenon is too complex to explain through a single set of factors (Naudé, 2013). However, individuals' motivations to become entrepreneur are broadly subdivided into three groups: push or pull situational factors or personal characteristics. Mueller & Thomas (2001) argue that situational factors include present lifestyle, childhood, family environment, education, age, work history, role models, and support

[1] It is important to note that entrepreneurship is discussed as a creative human process; the focus here is not on macro-environmental conditions influencing the level of entrepreneurship of countries.

networks (Mueller & Thomas, 2001). Push factors are negative situational factors pushing individuals to engage in entrepreneurial activity out of, for example, dissatisfaction with their current status or existing organizational structures (Baum et al., 1993; Van der Zwan et al., 2016). Pull factors are positive situational factors pulling individuals to engage in entrepreneurial activity because of, for example, an abundance of business opportunities or the desire for independence (Van der Zwan et al., 2016). The third group stresses the motivating power of personality traits supposedly possessed by entrepreneurs (Kaufmann & Dant, 1999). Personality traits are embedded in an individual and contain consistent patterns of thoughts, feelings, motives, and behaviors a person reveals across different situations (Weisberg et al., 2011). Studies following this approach argue that pursuing entrepreneurial behavior is, at least to some extent, the expression of personality; therefore, it is argued that an individual's personality traits play an essential role in becoming involved in entrepreneurial activity (Baum et al., 2014; Nga & Shamuganathan, 2010). Personality traits that are frequently argued as closely associated with entrepreneurial values and behavior are confidence, innovativeness, assertiveness, pro-activeness, leadership ability, need for control, achievement and independence, being open to new experiences, ability to make decisions quickly and to act in a rapidly changing and uncertain environment, and willing and daring to take on risks (Dubina & Ramos, 2013; Kaufmann & Dant, 1999; Kerr et al., 2017; Kreiser et al., 2010; Low, 2001; Mueller & Thomas, 2001; Schumpeter, 1934). Even though many scholars agree on using psychological profiling as a useful tool to analyze individuals' entrepreneurial activity, it is important to note that some authors criticize the personality approach to entrepreneurship. They argue that entrepreneurship requires too varied behaviors to be related to specific personality traits and they do not believe in a clear, universally acceptable definition of the entrepreneur and its personality traits (Baum et al., 2014; Perry, 1990).

2.1.2. Gender and entrepreneurial activity

The literature on the role played by an individual's gender on its entrepreneurial activity is like-minded about one thing: a real gender issue exists in entrepreneurship, which leads to more men starting a business than women (Minniti, 2009; Kepler & Shane, 2007). However, theories on the explanation and empirical evidence on determinants of the complex and multifaceted entrepreneurial gender gap vary widely. Studies on factors determining the entrepreneurial gender gap are divided into three broad categories.

First, studies that focus on differences in entrepreneurial intentions between men and women. It is generally accepted that men have stronger entrepreneurial intentions than women

(Díaz-García & Jiménez-Moreno, 2010; Gupta et al., 2009; Shinnar et al., 2012). Langowitz & Minniti (2007) show that opportunity recognition, which is positively related to entrepreneurial intention, is higher for men than for women. Koellinger et al. (2013) show that women are less confident about their entrepreneurial skills and are more afraid to fail than men. In addition, studies show that women are more risk-averse than men, subsequently women are less willing to take on the risks accompanied by setting up a business (Bönte & Piegeler, 2013; Caliendo et al., 2009; Croson & Gneezy, 2009). Furthermore, it is said that men are more competitively inclined than women, indicating that men are more likely to embrace competition compared to women who are less likely to set up a business in a competitive environment (Bönte & Piegeler, 2013; Croson & Gneezy, 2009). There is an abundance of empirical evidence for women's lack in certain characteristics, traits, and skills argued as needed for an individual to become entrepreneur. Therefore, literature often argues that the differences in perceptual variables between men and women explain a large share of the entrepreneurial gender gap. However, some studies show no significant role of these factors in explaining the gap (Malach-Pines & Schwartz, 2008). Some studies also found that once women become entrepreneurs, the gender differences in attitudes tend to decrease or even disappear, because their motivation, beliefs, and knowledge becomes similar to men's (Ahl, 2006; Camelo-Ordaz et al., 2016).

Second, studies that highlight gender-role stereotyping. Gender stereotypes are widely shared beliefs about characteristics and roles in society attributed to men and women (Gupta et al., 2009). The widely assumed gender stereotypes portray men as status achievers and consider men as more likely to exhibit dominant, competitive and assertive attitudes. Whereas women are portrayed as compliant and nurturing, which is reflected in their more compassionate and empathic behaviors (Rubio-Bañóna & Esteban-Lloret, 2016). Subsequently, men are generally viewed as the primary breadwinners who need to work to receive money to support the family, whereas women are defined by roles associated with family responsibilities such as housework and caring for the children (Eagly, 1987). Entrepreneurship is viewed as not accompanying these family responsibilities (Baughn et al., 2006; Bird & Brush, 2002). In addition, the role of entrepreneur is characterized as masculine rather than feminine (Baughn et al., 2006). The widely assumed personality traits of men are to a more considerable extent aligned with entrepreneurial behavior – taking risks, assertiveness, achievement, and leadership – than women's personality traits (Ahl, 2004; Marlow, 2002). Therefore, risky entrepreneurship is viewed as a more appropriate career choice for men than for women (Bird & Brush, 2002). Authors argue that due to this male stereotyping of entrepreneurship, female entrepreneurs receive lower credibility and legitimacy than their male counterparts (Baughn et al., 2006;

McKay, 2001). Subsequently, females face more challenges in obtaining financial credit, resources and assets, building up effective entrepreneurial networks, and receive necessary emotional support needed for their business (Minniti, 2009; Rubio-Bañóna & Esteban-Lloret, 2016; Shinnar et al., 2012). Women even describe the environment for starting a business as unfriendly and severe (Kolvereid et al., 1993). The traditional male stereotyping of entrepreneurship and discrimination towards female entrepreneurs are factors contributing to the entrepreneurial gender gap, since they discourage women to set up businesses and thus constrain the rates of female-owned businesses (Bird & Brush, 2002; McKay, 2001; Obschonka et al., 2014). Contrary to the arguments above, some authors argue that society's unsupportiveness toward female entrepreneurship is a motivation for females to become entrepreneurs out of dissatisfaction with society's structure (Uhlaner & Thurik, 2010; Tlaiss, 2015).

Third, studies that focus on the institutional context in which female and male entrepreneurship is embedded. The persistent cross-national variance in the entrepreneurial gender gap suggest that in some nations the conditions are more stimulating for women to get involved in entrepreneurial activities than in other nations (Bosma et al., 2020; Dheer et al., 2019). Institutional theory focuses on explaining this cross-national variance through the regulatory, normative, and cognitive systems in which individuals operate and behave (Baughn et al., 2006; Jamali, 2009). The institutional context includes deeply rooted behavior norms that shape and determine individuals' practices and orientations and subsequently constrain or empower certain types of behavior (Baughn et al., 2006; Vossenberg, 2013). Regarding entrepreneurship, the regulatory system consists of laws and policies that influence entrepreneurial businesses (Baughn et al., 2006). The normative system refers to religion and beliefs, individuals' view on the correct role of males and females in society, and cultural values that shape a society's entrepreneurial environment (Jamali, 2009). The cognitive system indicates the extent to which entrepreneurial skills and knowledge are diffused among individuals in a country through education, training, and information technology (Baughn et al., 2006; Vossenberg, 2013). Literature provides examples of system factors argued to affect the entrepreneurial gender gap. Regarding the regulatory system, Thébaud (2015) shows that work-family institutions as maternity leave policies are associated with a larger entrepreneurial gender gap. Regarding the normative system, culture and society are often unsupportive of women's entrepreneurship due to the male stereotyping of entrepreneurship (Bird & Brush, 2002; Eagly, 1987; Jamali, 2009). The normative environment shapes the appropriate behavior of individuals and individuals act out of conformity with the value standards (Baughn et al.,

2006). Subsequently females are discouraged to become entrepreneur and behave non-entrepreneurial. Regarding the cognitive environment, education is said to influence the entrepreneurial gender gap especially in developing countries where women generally have less access to education and skilled training than men (Vossenberg, 2013). Vossenberg (2013) explains that in some countries women's entrepreneurship is strictly constrained by the institutional context regardless of individual aspirations, favorable family support or economic circumstances. For example, in Pakistan gender inequality is embedded in the institutionalized legal and educational system which subsequently results in unequal rights and education for women (Vossenberg, 2013).

2.1.3. Culture influencing entrepreneurial activity

Hofstede (1991) describes culture as the collective programming of the mind which distinguishes individuals belonging to one group from individuals belonging to another group. Culture as collective programming of the mind of individuals within a society indicates the shared norms, values, and beliefs that are acquired through life about what is right and wrong in a society, with formal and informal practices supporting those codes of conduct (Hofstede, 1991; Kreiser et al., 2010; Mueller & Thomas, 2001). Thus, culture consists of informal institutions structuring a society's underlying system of norms, values, and beliefs and shaping the behavior of individuals of that peculiar society (Stephan & Uhlaner, 2010). Subsequently, culture results in a stream of codes of behavior passed on from one generation to the next through the process of imitation (Kroeber & Parsons, 1958).

According to cross-national entrepreneurship studies, the level of entrepreneurial activity across countries is not entirely explained when solely taking formal institutions and economic variables into account (Hofstede et al., 2004; Van Stel et al., 2005). The persistent cross-national variance in levels of entrepreneurship are contemporaneous differences of which a substantial part is attributed to culture (Davidsson, 1995). Implicating that certain cultural values characterizing a country's culture are more conducive and supportive for entrepreneurship than others (Freytag & Thurik, 2010; Hofstede et al., 2004; Mueller & Thomas, 2001). Culture affects individuals' entrepreneurial behavior through three mechanisms: individual-centric, collective, and societal mechanisms (Autio et al., 2013). The individual-centric mechanism operates through an individual's norms, values, beliefs, needs, and motivations (Autio et al., 2013). This mechanism affects an individual's awareness of business opportunities and their perception of the achievability and attractiveness of pursuing those opportunities (McMullen & Shepherd, 2006). A supportive culture with values

encouraging entrepreneurship may shape individuals' personality traits, motivation, and attitudes towards entrepreneurial behavior (Krueger, et al., 2013; Mueller & Thomas, 2001). The collective mechanism works through a society's individuals' shared expectations, preferences, and behavioral norms (Autio et al., 2013). It influences individuals' perceptions of the economic and social acceptability of them pursuing entrepreneurial activity. The societal mechanism operates through formal and informal institutions that are formed by a country's cultural values and preferences (Autio et al., 2013).

To operationalize national culture theoretically and empirically, I build further on Hofstede's (1991) cultural dimensions since these are the most commonly used measures of cultural values in cross-national entrepreneurship research and they are considered a reliable measure for cross-national cultural comparison (Beugelsdijk et al., 2017; Dheer et al., 2019). Hofstede (1991) proposed four dimensions along which the collective programming of a society could be analyzed: power distance, individualism, uncertainty avoidance, and masculinity. The dimension power distance indicates the extent to which less powerful individuals in a society expect and accept that power is unequally distributed (Hofstede, 1991). The dimension individualism indicates the extent to which people in a society feel independent (Hofstede, 1991). The dimension masculinity indicates the degree to which masculine values such as achievement, heroism, assertiveness, competition and material rewards for success are emphasized and valued by individuals in a society (Hofstede, 1991). The dimension uncertainty avoidance indicates the extent to which individuals in a society feel threatened by unknown or uncertain situations (Hofstede, 1991). The four dimensions are developed by comparing cultural norms and values of more than 100,000 employees and managers of the same multinational across 64 subsidiaries located in different countries. Hofstede (1991) argues that the individuals in the sample belonging to different countries and societies are similar to each other except in nationality.

Scholars have not reached an agreement on the directions of the relationships between the four cultural dimensions and entrepreneurial activity. Hofstede et al. (2004) summarize multiple papers with contradicting hypotheses that theorize on this relationship. Generally, the difference in the hypotheses depends on whether the relationship is viewed through the aggregate psychological trait, the social legitimation, or the dissatisfaction perspective (Davidsson, 1995; Uhlaner & Thurik, 2010). The aggregate psychological trait view of entrepreneurship assumes that a culture conducive to entrepreneurship has a determining effect on the mind and character of individuals. More individuals will possess entrepreneurial values and, subsequently, more individuals will display entrepreneurial behavior (Davidsson, 1995;

Mueller & Thomas, 2001; Thurik & Dejarding, 2011; Uhlaner & Thurik, 2010). The social legitimation or moral approval view of entrepreneurship builds upon the differences between societies' perceptions of entrepreneurs due to differences in social norms and institutions (Thurik & Dejarding, 2011; Uhlaner & Thurik, 2010). It is argued that when individuals within a society perceive entrepreneurs as individuals with high social status, or when entrepreneurship is accentuated within a society's educational system, or when tax incentives are implemented to encourage business start-ups, such a society subsequently brings about higher entrepreneurial activity (Uhlaner & Thurik, 2006; Etzioni, 1987). Both approaches view culture as a factor "pulling" entrepreneurial activity, indicating that culture serves as external motivation for the choice of individuals to become entrepreneur (Thurik & Dejarding, 2011). Studies following these approaches of entrepreneurship show societies characterized by low power distance, high individualism, low uncertainty avoidance, and high masculinity are conducive to entrepreneurial activity (Hayton et al., 2002; Hofstede et al., 2004; Hunt & Levie, 2002; McGrath et al., 1992). When following the dissatisfaction approach of entrepreneurship, the cultural dimensions hypothesized to stimulate entrepreneurial activity are opposite: high power distance, high uncertainty avoidance, low masculinity and low individualism (Uhlaner & Thurik, 2010). This is because the dissatisfaction view of entrepreneurship explains entrepreneurial activity through conflicting values and beliefs of entrepreneurs and non-entrepreneurs in a society (Hofstede et al., 2004). Organizations and structures in cultures characterized by these previously mentioned dimensions are less suited for entrepreneurs. As a consequence, according to the dissatisfaction theory, entrepreneurs have more difficulties in expressing themselves and are dissatisfied with their situation (Baum et al., 1993). Subsequently, those individuals choose self-employment in order to be independent of these existing organizations and structures (Baum et al., 1993; Hofstede et al., 2004; Wennekers, 2002). Empirical evidence in support of this view is scarce. However, Noorderhaven et al. (2004) found a positive effect of dissatisfaction with life on self-employment levels.

2.1.4. Culture influencing female entrepreneurial activity

The norms, values and beliefs that form the collective programming of the mind among individuals within a country prescribe desirable behaviors and expectations to individuals within a society (Batjargal et al., 2019). As these norms, values and beliefs influence individuals' behavior, and establish certain expectations; consequently they shape gender roles and stereotypes (Eagly & Wood, 1999). These gender roles and stereotypes influence how men and women are expected to behave within certain contexts (e.g., politics, employment) in a

society (Hyde, 2014). In addition, it also influences the biases and constraints men and women may face when their true behavior is incongruent with the expectations of their gender (Hyde, 2014). Societies' perceptions of the appropriate roles for women and men within a society are not in favor of females pursuing entrepreneurship. This phenomenon of gendered entrepreneurship is widely acknowledged (Ahl, 2006). However, the persistent cross-national variance in the entrepreneurial gender gap implicates that in some nations the conditions are more encouraging for women to pursue entrepreneurship than in other nations (Bosma et al., 2020; Dheer et al., 2019). This variance is to some extent attributed to the cross-national differences in cultural conditions (Baughn et al., 2016; Dheer et al., 2019; Vossenberg, 2013). However, literature is inconclusive on whether the cultural values – power distance, individualism, masculinity, and uncertainty avoidance – known to influence the entrepreneurial activity of individuals within a society are diverging in their effect on female and male entrepreneurial activity. A better understanding of how culture influences female entrepreneurial activity should help with designing better business development training programs for women entrepreneurs and properly advising policy makers.

2.2. Theory and hypotheses development: linking Hofstede's cultural dimensions to female entrepreneurial activity

2.2.1. Female entrepreneurial activity

Worldwide, the number of men being involved in entrepreneurial activity is significantly and systematically larger than that of women (Bosma et al., 2020; Minniti, 2009; Vossenberg, 2013). Even though an increase in the rate of women-owned business creation took place in the last decades, entrepreneurship remains a male-dominated activity in the twenty-first century (Elam et al., 2019). This persistent difference between the number of males and females being involved in entrepreneurial activity is, to some extent, due to gender stereotypical beliefs and gender role stratification in societies influencing the choice of men and women to engage in entrepreneurial activity (Marlow & Martinez-Dy, 2018). Gender is based on an institutionalized system of social stratification which allocates different roles and responsibilities to women and men and prescribes behaviors that are forbidden or encouraged (Eagly & Wood, 2012). Women are said to be compassionate and emphatic which aligns with the attributed stereotype role as caregiver of the home and family; men are dominant, competitive, and assertive which appears in their attributed stereotype role as main breadwinners for the family (Bird & Brush, 2002; De Bruin et al., 2007). Dominance, assertiveness, and competitiveness are characteristics central

to an entrepreneur (Caliendo & Kritikos, 2008). Therefore, gender beliefs and roles are in favor of male entrepreneurship, which makes entrepreneurship a gendered phenomenon (Ahl, 2006; Bird & Brush, 2002), leading to a self-fulfilling process in which women perceive entrepreneurship as more difficult and less suitable for them compared to men (Gupta et al., 2009). In support of this argument, research points out that women score higher on fear of failure, and lower on entrepreneurial confidence than men (Koellinger et al., 2013). While taking into account that gender stereotypes and gender behavioral norms are recognized globally (De Bruin et al., 2007; Eagly & Wood, 2012), it is expected that gender biases, stereotypes, and male-favored entrepreneurship shape global normative expectations that negatively influence women's choice of becoming involved in entrepreneurial activity.

Hypothesis 1: Across nations females are less likely to be involved in entrepreneurial activity than males.

2.2.2. Power distance

Power distance indicates the degree of acceptance of unequal distribution of power and authority by the relatively less powerful individuals in a society (Hofstede, 2001). It is widely acknowledged that women rather than men are the less powerful individuals in societies (Eagly & Wood, 2012). Consequently, in almost all societies, a power imbalance between men and women is present (Kim, 2009). However, in high power distant societies, a hierarchical order is accepted without further justification and individuals are focused on maintaining their current status in society, contrary to low power distant societies, in which people strive to equalize the distribution of power (Hofstede, 1991; Kreiser et al., 2010). Therefore, in high power distant societies the unequal power distribution between men and women is more accepted than in low power distant societies.

Regarding the decision to become entrepreneur, individuals in low power distant societies have more freedom and autonomy in their decision making and in possibly changing their position in society than in high power distant societies (Kreiser et al., 2010). High power distant societies are characterized by low levels of social mobility which restricts individuals to exert expected behavior belonging to their role in society (Kreiser et al., 2010). McKay (2001) shows that societies characterized by high social mobility are known for their high levels of entrepreneurial activity. Therefore, low power distant societies induce individuals to pursue entrepreneurial activity to a higher extent than high power distant societies.

In low power distant societies, women not fulfilling their stereotype role within a society is allowed to a higher extent than in high power distant societies (Kreiser, 2010). As a result, it is expected that low power distant societies induce females to involve in entrepreneurial activity to a higher extent than high power distant societies. To further support this theory, the following is considered. Mitchell et al. (2002) suggest that power distance influences an individual's entrepreneurial behavior by shaping an individual's perspective on the opportunities to become entrepreneur. Entrepreneurs rely on social networks for information on entrepreneurial experiences and access to resources needed for entrepreneurship (Vossenberg, 2013). However, these social networks are more strongly rooted within a society for males because of a longer historic tradition of male entrepreneurial networks (Vossenberg, 2013). In addition, women tend to have smaller and less diverse and effective entrepreneurial networks (Halabisky, 2017). Mitchell et al. (2002) argue that in high power distant societies rather than low power distant societies, individuals belonging to classes with less power have less access to experiences and resources needed for entrepreneurship than individuals in classes with higher power, due to lack of power. Accordingly, less powerful individuals in high power distant societies regard entrepreneurship as an area restricted to higher classes and thus these individuals are less alert to opportunities (Çelikkol et al., 2019; Mitchell et al., 2002). Female entrepreneurs belong to the classes with less power due to the male stereotyping of entrepreneurship and their lower level of access to powerful networks. Subsequently, females are less likely to pursue opportunities and get involved in entrepreneurial activity in high power distant societies than in low power distant societies because entrepreneurship belongs to males rather than females and this hierarchical order is accepted without further justification in a high power distant society (Mitchell et al., 2002; Hofstede, 1991).

Hypothesis 2: Power distance has a negatively moderating effect on the relationship between being female and being involved in entrepreneurial activity.

2.2.3. Individualism

In collectivistic societies individuals are part of close, interconnected groups that protect and offer lifelong safety in exchange for unconditional loyalty (Hofstede, 1991). This group loyalty is valued over individual achievement (Hofstede, 1991). In collectivistic societies individual initiative is not highly valued and deviance in opinion or behavior is often punished (Mueller & Thomas, 2001). Contrary, in individualistic societies individuals are independent and self-reliant (Hofstede, 1991). Individual goals, achievements, freedom of action, and independence

are highly valued in individualistic societies (Hofstede, 1991). Therefore, individualism rather than collectivism is a value considered to be related to the profile of an entrepreneur (Pinillos & Reyes, 2011). According to the aggregate psychological trait view of entrepreneurship, a society characterized by a cultural value conducive to entrepreneurship results in the development of individuals' personality traits towards this entrepreneurial value. Consequently, it is argued that entrepreneurial activity is more likely to flourish in an individualistic society, because the dominant cultural value of independence brings about entrepreneurial behavior rather than the dominant cultural value of group loyalty in collectivistic societies (Pinillos & Reyes, 2011). In support of this argument, empirical evidence shows a positive relationship between individualistic cultures and entrepreneurial activity (Mueller & Thomas 2001; Wennekers et al. 2002).

However, empirical evidence exists as well for the positive relationship between collectivism and entrepreneurial activity (Hunt & Levie 2002; Baum et al. 1993). To explain this relationship, Baum et al. (1993) provide an argument in line with the dissatisfaction view of entrepreneurship. They argue that individualistic societies are used to deal with individuals acting independently from each other, which enables entrepreneurs to gratify their motivation and need for entrepreneurial behavior in a common organizational environment. Contrary, entrepreneurs in collectivistic societies are less able to act independently within the existing organizational structures and are more likely to set up a business for themselves. Bullough et al. (2017) provide another explanation for this relationship. They argue that, in collectivistic societies, the loyalty of the tightly knit groups to which individuals belong provide more solid investment assurances or the ability to request investments with greater force. The latter is explained through the presumably larger network of the group compared to the network of one individual. In individualistic societies informal investments by closely related individuals are less occurring or restricted by the rule of law (Bullough et al., 2017; Hunt & Levie, 2002).

Regarding female entrepreneurial activity, arguments favoring the relationship between both collectivism and individualism and female entrepreneurial activity exist. In almost every part of the world women are perceived as the caregivers of the family and home to a larger extent than men (De Bruin et al., 2007). Therefore, collectivism may limit female entrepreneurial activity because the unconditional loyalty expected by the tightly knit groups reinforces the gender role stereotyping which indicates caring for the family before women's personal business (Bullough et al., 2017). Individualistic cultures value individual goals and achievements and thus stimulate women to set up businesses for themselves to a larger extent. However, Bullough et al. (2017) argue that collectivism provides tight network of relationships,

economic security, and emotional support encouraging and supporting women's business development. Women in individualistic societies can rely less on these types of resources provided by tightly knit group because the individuals in individualistic societies are chasing their own personal goals.

Even though these arguments indicate that ambiguity exists regarding the relationship of female entrepreneurial activity and individualism or collectivism, it is expected that individualism rather than collectivism has a positive effect on female entrepreneurial activity. To support this theory, following arguments are provided. In collectivistic societies, it is difficult for both men and women to become the individual they wish to be (Kim, 2009). This because, in collectivistic societies, ''we'' is more important than ''I'' (Pinillos & Reyes, 2011). This mindset requires sacrifices to some extent in favor of the well-being and well-doing of the group (Kim, 2009). However, a higher extent of sacrifices from certain individuals within the tightly knit group are often necessary to thrive and succeed as a "we" group. Since collectivistic societies are often highly patriarchal and openly sexist, it is generally the case that women are the ones sacrificing more for their husbands, children, and families rather than men (Kim, 2009). The power imbalance between men and women tends to be less clear-cut in individualistic cultures, since women pursue independence along with men (Kim, 2009). According to these arguments, it is likely to be less complicated for women in individualistic societies to overcome social and cultural expectations in order to become the autonomous individual they wish to be than in collectivistic societies. Therefore, when taking into account the traditional male stereotyping of entrepreneurship and discrimination towards female entrepreneurs, it becomes especially difficult for females to become entrepreneur. In addition, it is taken into account that the values and beliefs of an individualistic society rather than a collectivistic society are contributing to the development of females' entrepreneurial behavior.

Hypothesis 3: Individualism has a positively moderating effect on the relationship between being female and being involved in entrepreneurial activity.

2.2.4. Uncertainty avoidance

A society's level of uncertainty avoidance refers to the degree to which individuals rely on a country's norms and procedures meant to decrease the unpredictably of events (Ozgen, 2012; Shinnar et al., 2012). In uncertainty avoidant societies individuals tend to have greater fear of failure, lower willingness to take risks, lower levels of ambition and lower tolerance for unpredictability than in uncertainty tolerant societies (Hayton et al., 2002; Hofstede, 1991).

Shane (1993) shows that the rate of innovation is higher in uncertainty tolerant countries compared to uncertainty avoidant countries. In addition, Mueller & Thomas (2001) show that in uncertainty avoidant societies the tolerance for innovative behavior is low. Kreiser et al. (2010) show empirical evidence that the relationship between uncertainty avoidance and risk taking is negative, implicating that individuals in uncertainty avoidant societies take less risks. Therefore, the risk taking inherent in entrepreneurship is avoided to a higher extent in uncertainty avoidant societies compared to uncertainty tolerant societies (Mueller & Thomas, 2001; Shinnar et al., 2012). Besides, uncertainty tolerant societies accept non-traditional behavior to a greater extent, which subsequently makes entrepreneurs enjoy greater freedom and legitimacy (Mueller & Thomas, 2001). In addition, individuals that bring up innovative, groundbreaking ideas are highly valued in uncertainty tolerant societies which indicates that these societies are more supportive of individuals exerting entrepreneurial behavior (Hofstede, 1980; Mueller & Thomas, 2001). The social conditioning theory argues that individuals in a society tend to reinforce their values on each other, and subsequently demonstrate similar behavior (Best & Williams, 1997). Together with the aggregate psychological trait view, this view explains higher entrepreneurial activity through aggregated effects of individual characteristics. It is widely acknowledged that cultural values forming a society's collective programming of the mind influence individuals' norms, values, and beliefs (Mueller & Thomas, 2001). Therefore, an uncertainty tolerant society is argued to work as external motivation on individuals and their entrepreneurial behavior rather than an uncertainty avoidant society (Kreiser et al., 2010; McGrath et al., 1992; Osoba, 2009).

Regarding female entrepreneurial activity, the higher risk aversion of women has a negative influence on the probability of a female becoming involved in entrepreneurial activity (Adachi & Hisada, 2017; Caliendo et al., 2015). Besides, the image of an entrepreneur as risk taker is not in line with women's ingrained behavioral attitudes (Gupta et al., 2009). Therefore, women are less likely to engage in entrepreneurial activity than men. However, following the logic that culture shapes the development of personality traits, women in uncertainty tolerant societies tend to engage in risk taking activities to a higher extent than in uncertainty avoidant societies. Croson & Gneezy (2009) find that women are more likely than men to adapt their motivation to socio-cultural norms. Implicating that the positive attitude towards entrepreneurship in an uncertainty tolerant society has more effect on women engaging in entrepreneurial activity than men. Accordingly, the socio-cultural norms in an uncertainty avoidant society are more likely to discourage females to engage in risky entrepreneurial activities than the norms in uncertainty tolerant societies. In support of this argument, the

following argumentation is provided. Females have harder times receiving loans and support for entrepreneurship than men (Halabisky, 2017; Vossenberg, 2013). One of the reasons for this is that female entrepreneurs are stereotyped with features that are conflicting with those observed in entrepreneurs, typically men, who have achieved success in their business activities (Rubio-Bañóna & Esteban-Lloret, 2016). Implicating that investments in female entrepreneurship are viewed as more uncertain investments than in male entrepreneurship because male entrepreneurs showed more successes or because of unfair prejudgment such as women can't handle money as good as men (Bruni et al., 2004). However, in uncertainty tolerant societies the institutions or individuals that provide capital are more open-minded and willing to invest and provide credit to more uncertain projects, i.e. females involved in entrepreneurial activity, than they are in uncertainty avoidant societies (Ozgen, 2012). If females perceive the environment as a supportive one in which they can assemble the financial and other required resources, it is likely that they are motivated to engage in entrepreneurial activity to a higher extent than if the environment is unsupportive. It is expected that women in societies with higher levels of uncertainty tolerance are more likely to be involved in entrepreneurial activity than women in more uncertainty avoidant countries.

Hypothesis 4: Uncertainty avoidance has a negatively moderating effect on the relationship between being female and being involved in entrepreneurial activity.

2.2.5. Masculinity

The focus of a masculine society is on values as competitiveness, assertiveness, ambition, achievement, power, independence, self-confidence, materialism and the accumulation of money, whereas a feminine society places more emphasis on cooperativeness, modesty, caring for the weaker, job security and concern about the quality of life (Çelikkol et al., 2019; Dubina & Ramos, 2013; Hofstede, 1980). Individuals in masculine societies tend to be more assertive, self-confident, confrontational in social relationships, daring to take on risks and focus on economic growth and the accumulation of money than the more compliant and supportive individuals in feminine societies (Kreiser et al., 2010). Therefore, it is argued that individuals in a masculine society are more likely to exploit opportunities and interrelate with the external environment by getting involved in entrepreneurial activity (Kreiser et al., 2010; Osoba, 2009).

Even though both men and women foster masculine values in a masculine society, it does not make the widespread presence of gender role segregation ineffective (Dheer et al., 2019). The gender roles in a masculine society are clean-cut; men are supposed to be confident,

decisive, powerful and focused on material rewards, whereas women are expected to display nurturance and empathy (Çelikkol et al., 2019; Dheer et al., 2019; Hofstede, 1991). Therefore, some studies argue that in masculine societies women feel less related to the predominant norms in society and thus are less likely to engage in entrepreneurship because they perceive that they are less able to set up a company (Rubio-Bañóna & Esteban-Lloret, 2016). It is argued that for men to engage in caregiving activities and for women to execute a leadership position inside organizations is normal in feminine societies (Dheer et al., 2019). These studies are based on the argument that gender roles are less segregated in feminine societies. However, according to Busenitz & Lau (1996) the prioritized values and rationalized norms forming a society's collective programming of the mind influence the decision to get involved in entrepreneurial activity to a higher extent than the impact of gender positioning in society. This logic is followed for the development of the hypothesis. It is argued that setting up businesses emancipates women. It ameliorates their social status and sets them free from the traditional masculine-gendered environment by providing them with more autonomy (Datta & Gailey, 2012). Acknowledging that in a masculine society, females are more focused on achievement and power than in a feminine society it is assumptive that females value the empowerment coming with women-owned businesses to a higher extent than in feminine societies (Dheer et al., 2019). In addition, based on the aggregate psychological trait view of entrepreneurship, when taking into account that women are less assertive, more averse to competition and less confident about their entrepreneurial skills than men, it is expected that women in masculine societies – characterized by values as competitive, assertive, and self-confident – are more likely to be involved in entrepreneurial activity than women in feminine societies. In support of this argument, Dheer et al. (2019) provide empirical evidence for the weakening effect of masculinity on the negative relationship between being a woman and the probability of setting up a business.

Hypothesis 5: Masculinity has a positively moderating effect on the relationship between female and being involved in entrepreneurial activity.

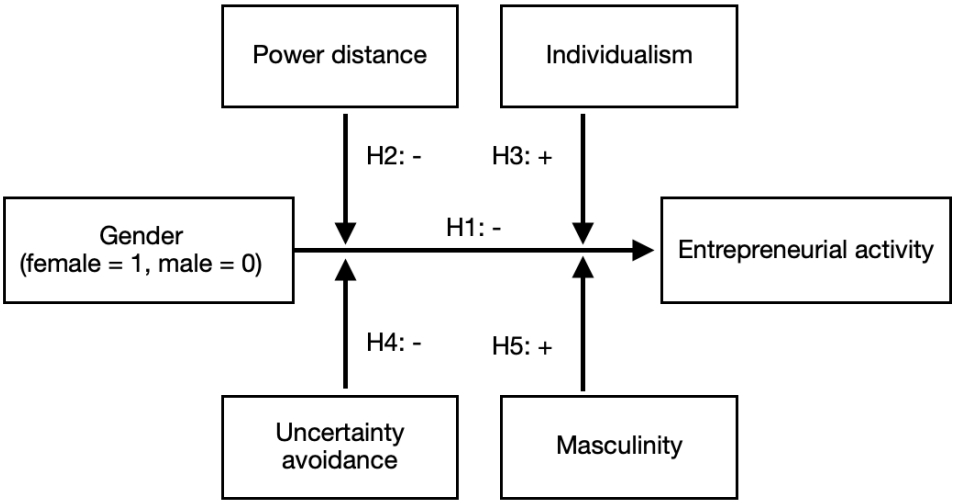

Figure 1. Conceptual model belonging to Hypotheses 1, 2, 3, 4, and 5.

3. Data and method

In order to investigate the research question *"How do the cultural dimensions power distance, uncertainty avoidance, masculinity, and individualism characterizing a society's collective programming of the mind affect female entrepreneurial activity?"* it is examined how the effect of being female compared to being male on the probability of being involved in entrepreneurial activity is moderated through the cultural dimensions. The empirical analysis is executed using a multilevel logistic regression with randomly varying intercepts and randomly varying slopes for the individual level independent binary variable of interest *female*.

3.1. Data

The dataset is a combination of data retrieved from several sources. Global individual-level data is retrieved from Global Entrepreneurship Monitor's (GEM) Adult Population Survey (APS) of 2016 and is used for the entrepreneurial activity related variables in the model. The APS consists of questions regarding characteristics, motivations and ambitions of individuals starting businesses (GEM, 2016). Country-level data for the cultural dimensions is retrieved from Hofstede's dataset (Geert Hofstede, 2015). Furthermore, country-level data regarding World Development Indicators of the year 2015 is retrieved from The World Bank. The combined dataset consists of a sample of 104,050 individuals across 45 countries, of which 11,866 individuals are involved in entrepreneurial activity and 92,184 are not. See Appendix A for the list of countries included in the sample. Table 1 shows the descriptive statistics of the variables used in the model. Table 2 in Appendix B shows the pairwise correlations between the variables. Table 3 in Appendix C shows the variance inflation factor (VIF) for all variables. The VIF is a measure of collinearity among independent variables within a multiple regression model and has a critical value threshold of 10 (Hsieh et al., 2003; O'brien, 2007). After conducting an ordinary least squares (OLS) regression including all variables, the VIFs indicate that multicollinearity is not a concern.

Table 1. Descriptive statistics.

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Dependent variable					
TEA	104,050	0.114	0.318	0	1
Individual level variables					
female	104,050	0.494	0.500	0	1
age	104,050	39.945	13.069	18	64
age squared	104,050	1766.371	1071.336	324	4096
education					
pre-primary	104,050	0.015	0.123	0	1
primary	104,050	0.090	0.286	0	1
lower secondary	104,050	0.166	0.372	0	1
upper secondary	104,050	0.326	0.469	0	1
post-secondary	104,050	0.129	0.335	0	1
first stage tertiary	104,050	0.248	0.432	0	1
second stage tertiary	104,050	0.025	0.157	0	1
working	104,050	0.722	0.448	0	1
network	104,050	0.393	0.488	0	1
opportunity	104,050	0.380	0.485	0	1
fear of failure	104,050	0.431	0.495	0	1
entrepreneurial confidence	104,050	0.496	0.500	0	1
Country level variables					
power distance	45	57.309	18.856	11	100
individualism	45	47.42	22.298	13	91
masculinity	45	49.098	17.207	5	100
uncertainty avoidance	45	70.09	20.325	29	100
log GDP per capita	45	9.746	0.914	7.381	11.527
GDP per capita growth	45	2.497	3.465	-4.351	23.986
unemployment	45	9.392	6.559	0.597	24.897

3.2. Variables

3.2.1. Dependent variable

The dependent variable, *TEA,* is a binary variable which captures whether an individual is engaged in entrepreneurial activity or not depicted by "1" or "0", respectively. This variable is appropriate for the model because it operates at the individual level and is in line with the focus of explaining the variance in women's and men's involvement in entrepreneurial activity (Dheer et al., 2019). In addition, this variable is widely accepted and used by researchers to measure entrepreneurial activity (Vodă et al., 2020).

Data for the dependent variable is retrieved from GEM's APS of the year 2016. The survey question belonging to the variable is *"Are you involved in total early-stage entrepreneurial activity (TEA)?"* (GEM, 2016). TEA is the entrepreneurial activity in the two early-stages of entrepreneurship combined; the stage before the start of a new firm, which is called nascent entrepreneurship, and the stage directly after the start of a new firm, which is called owning-managing a firm which is less than three-and-a half years old (GEM, n.d.; Vodă et al., 2020).

3.2.2. Independent variables

female is a binary independent variable which captures whether an individual is female, or male depicted by "1" or "0", respectively. The continuous independent variables *power distance, individualism, masculinity* and *uncertainty avoidance* capture Hofstede's cultural dimension scores developed for cross-cultural research and represent values between 0 and 100, where a higher value indicates a higher level for each country in the dataset. The cultural dimensions are time independent since cultural values of a country barely change (Hofstede, 1991). If they change, they change very slowly, from generation to generation (Hofstede, 1991). Hofstede's cultural dimensions are considered a valid measure to research cross-cultural differences between countries (Dheer et al., 2019). The cross-level interaction terms between the continuous variables and the binary variable are of particular interest, since they depict whether cultural dimensions moderate the effect of an individual's gender on an individual's entrepreneurial activity.

3.2.3. Control variables

11 control variables that represent both individual-level and country-level characteristics are incorporated in the model to account for alternative explanations of the dependent variable. These control variables are consistent with prior comparative cross-national entrepreneurship

research that uses multilevel analysis (e.g., De Clercq et al., 2013; Dheer et al., 2019; Kim & Li, 2014). The individual-level and country-level control variables are explained below. The reasoning of the relationship between the control variables and entrepreneurial activity is in line with the most frequent mentioned associations in the literature of entrepreneurship. However, arguments might exist for the opposite direction of the relationships. Table 4 in Appendix D represents an overview of the control variables and their descriptions.

3.2.3.1. Individual level control variables

At the individual level the model controls for socio-demographic factors and individual perceptual factors. Two of the socio-demographic factors incorporated in the model are *age* and *age squared*. It is argued that the age of an individual has a negative and increasing association with entrepreneurial activity; younger individuals are more likely to start new businesses than older individuals and this negative relationship gets stronger for higher levels of age[2] (Levesque & Minniti, 2006; Bohlmann et al., 2017). The model controls for *education* which depicts an individual's educational attainment level. According to literature, higher levels of educational attainment have a positive influence on entrepreneurial activity (Robinson & Sexton, 1994; Delmar & Davidsson, 2000). The control variable *working* is added because it is argued that employed individuals are employed are more likely to start new businesses than individuals that are not working (Arenius & Minniti, 2005). The model controls for four individual perceptual factors; *network, opportunity, fear of failure* and *entrepreneurial confidence.* In line with the study by Vodă et al. (2020) the outcomes of the individual perceptual factors indicate that women and men have significantly different perceptions regarding their entrepreneurial ability, see Table 5, 6, 7 and 8 depicted in Appendix E, respectively. The variable *network* depicts whether an individual knows someone personally who started a business in the past two years. Having personal connections with existing entrepreneurs often reduces transaction costs when starting a business and it generates knowledge spillovers. Both have a positive effect on the process of getting involved in entrepreneurial activity (Turkina, 2018; Welter, 2011). The individual perceptual factor *opportunity* depicts whether an individual believes that there exist good opportunities to start a new business in the area the individual lives in the next six months. Having the perception of facing an entrepreneurial opportunity abundant future is a motivating factor that encourages individuals to start their own business (McMullen & Shepherd, 2006). The variable *fear of failure* depicts whether an individual's fear of failure is an obstacle for

[2] I deleted individuals above the age of 64 from the dataset, since age 65 is considered a typical retirement age.

launching a business. Fear of failure is widely assumed to be a barrier to entrepreneurship (Cacciotti & Hayton, 2014). The variable *entrepreneurial confidence* depicts whether an individual is confident about its necessary knowledge, skills and experience to start a new business. An individual's entrepreneurial confidence has a positive effect on its entrepreneurial activity (Arenius & Minniti, 2005). The research by Koellinger et al. (2007) points out that countries with a high percentage of individuals that are confident about their own entrepreneurial skills, turn out to be the countries with the highest percentage of entrepreneurs.

3.2.3.2. Country level control variables

At the country level the model controls for the economic environment of a country. The choices individuals made in the year 2016 regarding whether getting involved in entrepreneurial activity or not are presumed to be more dependent on the economic environment of their country in 2015 rather than 2016. Therefore, to allow for a one-year lag between the country-level control variables and the variable depicting whether an individual is involved in TEA or not, the control variables added to the model are of the year 2015 (Dheer et al., 2019; Kim & Li, 2014). The variables *GDP per capita*[3] and *GDP per capita growth* are used as indicator for a country's economic performance and capture the gross domestic product (GDP) per capita and its growth, respectively, of a country in the year 2015. Ambiguity in literature exists regarding the relationship between entrepreneurial activity and economic performance. Several scholars did and attempt to measure the impact of entrepreneurship on economic performance and, opposite, the impact of economic performance on entrepreneurship (e.g. Koellinger & Thurik, 2012; Hartog et al, 2010; Acs & Szerb, 2007; Wennekers et al., 2007; Wong et al., 2005). Since the sample in this research contains countries from all over the world, including developing and developed countries, the control variables *GDP per capita* and *GDP per capita growth* are mainly used to account for the differences in economic environments across countries. Furthermore, the variable *unemployment* controls for the unemployment level of a country. This control variable is added to the model because it reflects the labor market condition of a country and is likely to influence individuals' decisions to start a business (Hechavarría et al., 2018; Kim & Li, 2014). For example, Thurik et al. (2008) argue that, on the one hand, an increase in the unemployment rate might have a positive effect on self-employment through a country's individuals' motivation in getting involved in entrepreneurial activity because individuals are less likely to find a job. On the other hand, in times of economic crisis a country's

[3] The former variable depicts the natural logarithm of GDP per capita; this transformation is done in order to be able to better interpret the effect size of the variable.

unemployment level increases and this might have a negative effect on self-employment because the circumstances of setting up a business are undesirable (Hartog et al., 2010).

3.3. Method

In this section first is elaborated on the structure of the data. Second, a stepwise analysis of the data is executed in order to confirm the validity of the use of a multilevel logistic model and to examine which model best fits the data. Lastly, the multilevel logistic model with random intercepts and random slopes for the variable *female* including cross-level interaction terms is presented. Table 10 provides explanations of the model components.

3.3.1. Multilevel logistic regression

The combination of the country-level data on Hofstede's cultural dimensions and on countries' economic environments combined with the global individual-level data from GEM's APS indicates a multilevel structure of the dataset. Data of individuals from the same country are related because individuals experience identical country-specific characteristics, which suggest that the data is clustered. More clearly, the observations at the individual level are nested within a higher level, the country level, which indicates a natural hierarchy within the data (Bryan & Jenkins, 2013).

The dependent variable in this research is binary coded and suggest the use of a logistic regression (Guo & Zhao, 2000). However, the use of a single-level logistic regression might violate the traditional linear and binary regression models' most basic and important assumption of lack of correlation between the standard errors of observations (Bressoux, 2010; Guo & Zhao, 2000; Pemer et al., 2018). Ignoring the within-country correlation and subsequently ignoring the multilevel structure of data can result in biases in parameter estimates and might lead to an underestimation of their standard errors. This underestimation leads to an overestimation of the test statistic and consequently leads to statistical significance for estimates of parameters which are actually statistically insignificant. In that case the null hypothesis of no effect is rejected wrongly (Cheah, 2009). According to Cheah (2009) and Moulton (1990) the use of a multilevel method to model the clustering of data is a better approach than fixing the standard errors of the OLS or binary regression estimates.

Several papers recommend the mean centering of the individual-level and country-level explanatory variables used in multilevel models in order to better interpret the estimates of the regression (e.g., Pemer et al., 2018; Sommet & Morselli, 2017; Steel & Taras, 2010). However, I proceed by using the uncentered variables for the different effects of interest in the model.

This in order to reduce the chance of distortion in the regression results to a minimum (Echambadi & Hess, 2007; Kelley et al., 2017). In Appendix F I elaborate more on this choice.

3.3.2. Validity and best fit check

To verify whether a multilevel logistic analysis is suitable for the data used, several tests are done. In the following sections three models are conducted to examine which model best fits the data.

3.3.2.1. Null model

The null model is an empty multilevel logistic model that includes no independent or control variables, see Formula 1. It is used to test the need for multilevel analysis (Aguinis et al., 2013).

$$TEA_{ij} = \gamma_{00} + u_{0j} \qquad \{\text{with } i = 1, \dots N;\ j = 1, \dots K\} \qquad (1)$$

Formula 2 below depicts the equation belonging to the dependent variable of the multilevel logistic model. TEA_{ij} is the logit of the probability that an individual is an entrepreneur, i.e. *y* is "1", divided by the probability that an individual is not an entrepreneur, i.e. Y is "0". Therefore, TEA_{ij} depicts the logit of the odds of an individual being an entrepreneur.

$$TEA_{ij} = Logit\left(\frac{[Probability\ (TEA_{ij} = y)]}{[Probability\ (TEA_{ij} = Y)]}\right) \qquad (2)$$

The results of the null model are used to determine whether evidence of significant clustering exists in the dataset (Rabe-Hesketh & Skrondal, 2008). Clustering in the data is present when signification variation across countries exists in the average of the probability of an individual being entrepreneur. To verify whether this significant variation exists, the intra-class correlation coefficient (ICC) is examined. The ICC calculates the extent to which the odds vary from one country to another (Sommet & Morselli, 2017). In a multilevel logistic model two types of variances in the binary outcome exist; the variance across countries, var(u_{0j}), and the variance within countries (Sommet & Morselli, 2017). The ICC is the proportion of the total variance in the outcome variable that is due to between country variance, see Formula 3. However, the logistic regression model does not include the individual-level residual and therefore the assumed individual-level variance component $\frac{\pi^2}{3}$ is taken regarding the variance within countries (Sommet & Morselli, 2017).

$$ICC = \frac{\text{var}(u_{0j})}{\text{var}(u_{0j}) + (\frac{\pi^2}{3})} \quad (3)$$

Table 9 in Appendix G shows the results of the null model and the ICC. The ICC of the dataset which contains 104,050 individuals across 45 countries is 7.61%. This indicates that 7.61% of the variance in the dependent variable can be attributed to between country differences and 92.39% to within country differences. Heck et al. (2013) argue that there is no need for a multilevel analysis if less than 5% of the variation in the outcome variable exists between groups. When the ICC is zero or negligible, using a multilevel analysis is most often not recommended. Contradictory, some researchers argue that any ICC above zero, even the ones lower than 5%, alter the inferences or the accuracy of the inferences made from data analysis when not using multilevel analysis (Aguinis et al., 2013). This because an ICC larger than zero suggest that a higher-level variable may exist that explains heterogeneity in the lower-level variables across groups (Kahn, 2011). According to this argument, multilevel analysis is always preferred over single-level analysis when data is clustered (Bliese, 1998; Sommet & Morselli, 2017). Using the conventional threshold of Heck et al. (2013) as indication for substantial clustering it is concluded that a multilevel model is suitable for the dataset with ICC of 7.61%.

In addition, the results of the likelihood ratio (LR) test are significant. The LR test is a Chi-square test which assesses the goodness of fit of the empty multilevel logistic model with randomly varying country intercepts versus the goodness of fit of the single-level logistic model with no randomly varying intercepts (Sommet & Morselli, 2017). Thus, incorporating the multilevel logistic model with randomly varying country intercepts is a significant improvement in fit relative to the single-level logistic model with fixed country intercepts. It is concluded that the results of the tests provide evidence for a nested data structure that requires multilevel modelling rather than a single-level data analytic approach.

3.3.2.2. Constrained intermediate model and augmented intermediate model

In a multilevel logistic model, the choice between fixed and random parameter slopes exists. Conducting a random slopes model implicates that the effects of the individual-level variables on the dependent variable are allowed to vary from one country to another (Sommet & Morselli, 2017). Contradictory, using fixed slopes in the multilevel logistic model indicates that it is assumed that the association between the independent variables and the dependent variable is equal for each country (Sommet & Morselli, 2017).

The constrained intermediate model (CIM) and augmented intermediate model (AIM) are used to determine the extent to which the effect of the individual level variable on the odds of an individual being involved in entrepreneurial activity varies from one country to another. First, the CIM is run which contains all individual level variables and all country level variables, see Formula 4. This model does not allow for random effects.

$$TEA_{ij} = \gamma_{00} + \gamma_{10} female_{ij} + \gamma_{20} \mathrm{X}_{ij} + \gamma_{01} powerdistance_{j} + \gamma_{02} individualism_{j} + \gamma_{03} masculinity_{j} + \gamma_{04} uncertaintyavoidance_{j} + \gamma_{05} \Psi_{j} + u_{0j} \quad (4)$$

Second, the AIM is run which in addition to the former model includes the residual term associated with *female* and thus allows for its random effect, see Formula 5. The model tests for random variations of *female* because it is expected that the effect of an individual's gender on the probability of being involved in entrepreneurial activity to depend – to some extent – on country characteristics, i.e. cultural dimensions.

$$TEA_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j}) female_{ij} + \gamma_{20} \mathrm{X}_{ij} + \gamma_{01} powerdistance_{j} + \gamma_{02} individualism_{j} + \gamma_{03} masculinity_{j} + \gamma_{04} uncertaintyavoidance_{j} + \gamma_{05} \Psi_{j} + u_{0j} \quad (5)$$

The results of the CIM and AIM are depicted in Table 11 in Appendix H. The variance in the effect of *female* across countries is var(u_{1j}) = 0.061 ($p < 0.01$), which indicates that 6.10% of the variation in the effect of *female* is due to between country differences. Concluding that there are differences across countries in the relationship between gender and whether an individual is involved in entrepreneurial activity or not. To determine whether the CIM or the AIM better fits the data, the likelihood ratio test depicted in Formula 6 is conducted. The number of degrees of freedom equals one because the random slope variance of one parameter is added to the AIM compared to the CIM.

$$LR\ \chi 2\ (1)\ =\ deviance\ (CIM)\ -\ deviance\ (AIM) \quad (6)$$

The likelihood ratio test shows evidence that the deviance of the AIM is significantly lower than the deviance of the CIM: $LR\ \chi 2\ (1)$ = 59,172.625 - 59,116.501 = 56.124, $p < 0.001$. This indicates that allowing the relationship between *female* and *TEA* to be different for each

country improves the fit of the model. Therefore, the random slope of *female* is incorporated into the model.

3.3.3. Final model including cross-level interactions

The multilevel logistic regression model with *TEA* as binary dependent variable estimates the odds of an individual being involved in entrepreneurial activity while taking into account the fact that individuals are nested in countries with specific characteristics. The model estimates these odds as a function of lower level variables, i.e. lower-level direct effects; higher level variables, i.e. cross-level direct effects; and the interrelatedness of both, i.e. cross-level interaction effects (Aguinis et al., 2013; Sommet & Morselli, 2017). The multilevel model is often used to examine the cross-level interaction effect of how the macro context affects the impact of an independent variable at the micro level (Guo & Zhao, 2000). Likewise, in this research the multilevel model is used to examine the cross-level interaction effect of how the cultural dimensions affect the impact of an individual's gender on the odds of whether an individual is involved in entrepreneurial activity or not. The combined two-level logistic regression model with randomly varying intercepts and randomly varying slopes for *female* consist of the cross-level interaction terms and the explanatory variables which are included in the intermediated models as well, see Formula 7 below.

$$TEA_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j})female_{ij} + \gamma_{20}\mathrm{X}_{ij} + \gamma_{01}powerdistance_j + \gamma_{02}individualism_j + \gamma_{03}masculinity_j + \gamma_{04}uncertaintyavoidance_j + \gamma_{05}\Psi_j + \gamma_{11}(female_{ij} * powerdistance_j) + \gamma_{22}(female_{ij} * individualism_j) + \gamma_{33}(female_{ij} * masculinity_j) + \gamma_{44}(female_{ij} * uncertaintyavoidance_j) + u_{0j} \quad (7)$$

Table 10. Model components with description.

Model components	Description
TEA_{ij}	The dependent variable TEA_{ij} is a binary variable which takes value "1" if individual *i* of country *j* is involved in early-stage entrepreneurial activity and value "0" if not.
γ_{00}	γ_{00} is the general intercept of the model and is equal to the grand mean of the dependent variable across all countries when the explanatory variables are equal to zero.
$female_{ij}$	The independent variable $female_{ij}$ is a binary variable which takes value "1" if individual *i* of country *j* is female and "0" if individual *i* of country *j* is male.
γ_{10}	γ_{10} is the regression coefficient of the direct effect of $female_{ij}$ on $TEA_{ij.}$
u_{1j}	The residual term u_{1j} is the error on the individual level in the slope γ_{10}, it captures the deviation of the country-specific slope from the fixed slope. The country-specific slope is the specific effect of $female_{ij}$ within a country. The fixed slope is the average effect of $female_{ij}$ across countries. The variance component $var(u_{1j})$ is the random slope variance.
X_{ij}	X_{ij} represents all the control variables added to the model on the individual level and depicts the score of individual *i* in country *j* on the control variable, see Table 1 for an overview of the individual-level control variables added to the model.
γ_{20}	γ_{20} is the regression coefficient of the direct effect of a certain control variable on $TEA_{ij.}$
$powerdistance_j$, $individualism_j$, $masculinity_j$, $uncertaintyavoidance_j$	The continuous variables $powerdistance_j$, $individualism_j$, $masculinity_j$ and $uncertaintyavoidance_j$ depict the level of Hofstede's cultural dimensions power distance, individualism, masculinity and uncertainty tolerance for country *j*, respectively.
$\gamma_{01}, \gamma_{02}, \gamma_{03}, \gamma_{04}$	$\gamma_{01}, \gamma_{02}, \gamma_{03}, \gamma_{04}$ are the regression coefficients of the effect of $powerdistance_j$, $individualism_j$, $masculinity_j$ and $uncertaintyavoidance_j$ on TEA_{ij}, respectively.
Ψ_j	Ψ_j represents all the control variables added to the model on the country level and depicts the score of country *j* on the control variable, see Table 1 for an overview of the country-level control variables added to the model.
γ_{05}	γ_{05} is the regression coefficient of the effect of a certain control variable on TEA_{ij}.
$female_{ij} * powerdistance_j$, $female_{ij} * individualism_j$, $female_{ij} * masculinity_j$, $female_{ij} * uncertaintyavoidance_j$	$(female_{ij} * powerdistance_j)$, $female_{ij} * individualism_j)$, $(female_{ij} * masculinity_j)$, $(female_{ij} * uncertaintyavoidance_j)$ represent the cross-level interaction terms.
$\gamma_{11}, \gamma_{22}, \gamma_{33}, \gamma_{44}$	The regression coefficients $\gamma_{11}, \gamma_{22}, \gamma_{33}$ and γ_{44} associated with the cross-level interaction terms between $female_{ij}$ and $powerdistance_j$, $individualism_j$, $masculinity_j$ and $uncertaintyavoidance_j$, respectively, depict the effect of the cultural dimension of country *j* on the effect of $female_{ij}$ on TEA_{ij}. In other words, the regression coefficients depict the multilevel logistic estimation of the effect individual *i*'s gender has on the probability of being involved in entrepreneurship in country *j* characterized by a certain level of a certain cultural dimension.
u_{0j}	The residual term u_{0j} is the error on the country level in the intercept γ_{00}, it captures the deviation of the country-specific intercept from the fixed intercept. The country-specific intercept is the average of the dependent variable within a country when the explanatory variables are equal to zero. The fixed intercept is the grand mean of the dependent variable across all countries when the explanatory variables are equal to zero. The variance component $var(u_{0j})$ is the random intercept variance.

4. Results and analysis

4.1. Regression analyses

Table 12 shows the regression results of the multilevel logistic model with random intercepts and random slopes for *female* including cross-level interaction terms. Table 13 shows the corresponding odds ratios. It is important to note that in multilevel logistic regressions, the coefficient estimate of the cross-level interaction parameter does not correspond mathematically to the interaction effect (Sommet & Morselli, 2017). The calculation of the correct cross-level interaction effect is quite complex for multilevel logistic modeling and there is no statistical package available for the software used. Interpreting the coefficient estimate of the cross-level interaction parameter is most of the times appropriate (Kolasinski & Siegel, 2010). Therefore, following Sommet & Morselli (2017) I rely on the simple significance-of-the-product-term approach.

Regarding the control variables, Table 12 shows insignificant estimates for the variables *GDP per capita growth* and *unemployment* and significant and negative estimates for *GDP per capita*. The latter implies that in countries with higher levels of GDP per capita individuals are less likely to be involved in entrepreneurial activity. Table 12 shows a positive and significant estimate for *age* and a negative and significant, however weak, association for age^2. Indicating that older individuals are more likely to be involved in entrepreneurial activity, but this effect diminishes for higher ages. Regarding the categorical variable *education,* the regression estimates are positive and significant for *primary* and *second stage tertiary* education. This indicates that individuals with a primary or second stage tertiary educational attainment level are more likely to be involved in entrepreneurial activity compared to individuals with pre-primary educational attainment level. The odds ratios depicted in Table 13 show that the odds of *TEA* being "1" multiplies by 3.70 when an individual is working compared to not working ($p < 0.01$); by 2.30 when an individual knows someone personally who started a business in the past two years compared to not knowing ($p < 0.01$); by 1.60 when an individual perceives opportunities for starting a business compared to a not opportunity perceiving ($p < 0.01$); by 4.03 when an individual has the knowledge, skill and experience required for starting a new business compared to not having ($p < 0.01$). In addition, the models show that the odds of TEA being "1" decreases by 33% (1 – 0.67; $p < 0.01$) when fear of failure prevents an individual from starting a business compared to not preventing.

Regarding the cultural dimensions, Table 12 Model 2 shows that the estimate for *power distance* is significant ($p < 0.05$) and negative ($\beta = -0.010$). Indicating that higher levels of

power distance in a country decrease the likelihood of an individual getting involved in entrepreneurial activity. I found insignificant results for the variables *individualism, masculinity* and *uncertainty avoidance.* Model 6 includes all cultural dimensions, the estimate for *power distance* stays significant ($p < 0.05$) and negative ($\beta = -0.009$); the other cultural dimensions show insignificant results. The corresponding odds ratio in Table 13 Model 6 shows that for a one-unit increase in *power distance*, the odds of *TEA* being "1" decreases by 1% ($1 - 0.99$; $p < 0.05$).

Table 12 Model 1 shows evidence for H1. The significant ($p < 0.01$) and negative ($\beta = -0.10$) association between *female* and *TEA* implies that across nations women are less likely to be involved in entrepreneurial activity than men. Congruent with H1, the odds ratios in Table 13 Model 1 indicates that being female compared to being male decreases the probability of *TEA* being "1" by 10% ($1 - 0.9$; $p < 0.01$).

Table 12 Model 2 shows contradictory evidence for H2, the estimate for the cross-level interaction term between *female* and *power distance* is significant ($p < 0.01$) and positive ($\beta = 0.005$), indicating that higher levels of power distance lead to a higher likelihood of females being involved in entrepreneurial activity. The odds ratio in Table 13 Model 2 indicates that for a one-unit increase in *power distance*, being female increases the odds of *TEA* being "1" by 0.5% ($p < 0.01$). Therefore, *power distance* has a positive and significant moderating effect on the relationship between *female* and *TEA*.

Table 12 Model 3 shows contradictory evidence for H3, the estimate for the cross-level interaction term between *female* and *individualism* is significant ($p < 0.01$) and negative ($\beta = -0.006$), indicating that higher levels of individualism lead to a lower probability of females being involved in entrepreneurial activity. The odds ratio in Table 13 Model 3 indicates that for a one-unit increase in *individualism,* being female decreases the odds of *TEA* being "1" by 0.6% ($1 - 0.994$; $p < 0.01$). Therefore, *individualism* has a negative and significant moderating effect on the relationship between *female* and *TEA*. It is striking that the estimate for *female* in Table 12 Model 3 becomes positive ($\beta = 0.188$; $p < 0.05$) when adding the cross-level interaction term between *female* and *individualism*. The reversal of the sign, from negative to positive, of the relationship between being female compared to being male and being involved in entrepreneurial activity suggests that if the level of *individualism* in a country is equal to zero, being female has a positive effect on the probability of being involved in entrepreneurial activity.

The estimates for the cross-level interaction term between *female* and *masculinity,* and *female* and *uncertainty avoidance* in Model 4 and 5, respectively, are insignificant. Indicating

that in the model there is no evidence for a moderating effect of a country's level of masculinity or uncertainty avoidance on the relationship between being female and the probability of being involved in entrepreneurial activity. Model 6 shows the results of the conducted joint analysis which evaluates all moderation effects within one regression model. The cross-level interaction term between *female* and *individualism* stays significant ($p < 0.01$) and negative ($\beta = -0.007$). Again, the sign of the estimate for *female* becomes positive, however the estimate is statistically insignificant.

Table 12. Regression results of the multilevel logistic model with random intercepts and random slopes for *female* with cross-level interaction terms.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level independent variable						
female	-0.106***	-0.409***	0.188**	-0.117	-0.164	0.198
	(0.041)	(0.118)	(0.079)	(0.121)	(0.146)	(0.288)
Country-level independent variables						
power distance		-0.010***				-0.009**
		(0.004)				(0.004)
individualism			0.001			-0.001
			(0.004)			(0.004)
masculinity				-0.003		-0.001
				(0.003)		(0.003)
uncertainty avoidance					0.002	0.001
					(0.003)	(0.004)
Cross-level interaction variables						
female * power distance		0.005***				0.001
		(0.002)				(0.002)
female * individualism			-0.006***			-0.006***
			(0.002)			(0.002)
female * masculinity				-0.003		-0.001
				(0.003)		(0.003)
female * uncertainty avoidance					0.001	-0.002
					(0.002)	(0.002)
Country-level control variables						
logarithm GDP per capita	-0.183***	-0.280***	-0.131	-0.174***	-0.173***	-0.177*
	(0.056)	(0.076)	(0.088)	(0.058)	(0.058)	(0.094)
GDP per capita growth	-0.000	-0.001	-0.003	0.002	0.004	-0.000
	(0.016)	(0.015)	(0.017)	(0.016)	(0.017)	(0.018)
unemployment	-0.018	-0.013	-0.013	-0.019	-0.021	-0.008
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.015)
Individual level control variables						
age	0.023***	0.023***	0.023***	0.023***	0.023***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
age^2	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 12. Continued.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level control variables						
education (base category: pre-primary)						
primary	0.190*	0.192*	0.189*	0.190*	0.190*	0.190*
	(0.113)	(0.113)	(0.113)	(0.113)	(0.113)	(0.113)
lower secondary	0.044	0.047	0.045	0.045	0.045	0.046
	(0.110)	(0.110)	(0.110)	(0.110)	(0.110)	(0.110)
upper secondary	0.081	0.083	0.081	0.081	0.082	0.083
	(0.108)	(0.107)	(0.108)	(0.108)	(0.108)	(0.108)
post-secondary	0.093	0.095	0.094	0.092	0.093	0.096
	(0.110)	(0.110)	(0.110)	(0.110)	(0.110)	(0.110)
first stage tertiary	0.150	0.152	0.151	0.149	0.150	0.153
	(0.108)	(0.108)	(0.108)	(0.108)	(0.108)	(0.108)
second stage tertiary	0.225*	0.229*	0.227*	0.226*	0.226*	0.232*
	(0.121)	(0.121)	(0.121)	(0.121)	(0.121)	(0.121)
working	1.307***	1.308***	1.308***	1.307***	1.308***	1.309***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)
network	0.834***	0.834***	0.834***	0.834***	0.834***	0.834***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
opportunity	0.464***	0.463***	0.463***	0.464***	0.464***	0.463***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
fear of failure	-0.397***	-0.397***	-0.398***	-0.397***	-0.397***	-0.397***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
entrepreneurial confidence	1.394***	1.392***	1.392***	1.394***	1.394***	1.391***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Fixed part						
intercept (γ_{00})	-2.838***	-1.363	-3.459***	-2.768***	-3.040***	-2.506**
	(0.556)	(0.891)	(0.757)	(0.573)	(0.645)	(1.045)
Variance components						
random intercept variance (var(u_{0j}))	0.166***	0.155***	0.178***	0.167***	0.165***	0.162***
	(0.034)	(0.034)	(0.040)	(0.037)	(0.036)	(0.036)
random slope variance (var(u_{1j}))	0.059***	0.042***	0.032**	0.059***	0.063***	0.028**
	(0.017)	(0.016)	(0.013)	(0.019)	(0.021)	(0.012)
ICC (%)	4.81	4.51	5.13	4.83	4.79	4.70
Model fit statistic						
AIC[a]	59149.2	59155.45	59160.99	59167.14	59167.19	59169.13
Log likelihood (ln L)	-29554.6	-29555.72	-29558.494	-29561.571	-29561.594	-29556.566
Degrees of freedom (k)	20	22	22	22	22	28

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 104,050
Countries *K* (level 2 groups) = 45
[a]AIC is Aikake's information criterion = -2(ln L) + 2k. Where (ln L) is the maximized log-likelihood of the model and k is the degrees of freedom (i.e. the number of parameters estimated in the model). Gradually smaller values over models denote improved model fit.

Table 13. Odds ratios of the multilevel logistic model regression results with random intercepts and random slopes for *female* with cross-level interaction terms.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level independent variable						
female	0.899***	0.664***	1.207**	0.890	0.848	1.219
	(0.037)	(0.078)	(0.096)	(0.108)	(0.124)	(0.352)
Country-level independent variables						
power distance		0.990***				0.991**
		(0.004)				(0.004)
individualism			1.001			0.999
			(0.004)			(0.004)
masculinity				0.997		0.999
				(0.003)		(0.003)
uncertainty avoidance					1.002	1.001
					(0.003)	(0.004)
Cross-level interaction variables						
female * power distance		1.005***				1.001
		(0.002)				(0.002)
female * individualism			0.994***			0.994***
			(0.002)			(0.002)
female * masculinity				1.000		1.002
				(0.002)		(0.002)
female * uncertainty avoidance					1.001	0.998
					(0.002)	(0.002)
Country-level control variables						
logarithm GDP per capita	0.833***	0.756***	0.877	0.840***	0.841***	0.838*
	(0.047)	(0.057)	(0.077)	(0.049)	(0.049)	(0.079)
GDP per capita growth	1.000	0.999	0.997	1.002	1.004	1.000
	(0.016)	(0.015)	(0.017)	(0.016)	(0.017)	(0.018)
unemployment	0.982	0.987	0.987	0.981	0.979	0.992
	(0.013)	(0.013)	(0.014)	(0.013)	(0.014)	(0.015)
Individual level control variables						
age	1.023***	1.023***	1.023***	1.023***	1.023***	1.023***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
age^2	1.000***	1.000***	1.000***	1.000***	1.000***	1.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 13. Continued.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level control variables						
education (base category: pre-primary)						
primary	1.209*	1.211*	1.208*	1.209*	1.210*	1.210*
	(0.137)	(0.137)	(0.137)	(0.137)	(0.137)	(0.137)
lower secondary	1.045	1.048	1.046	1.046	1.046	1.047
	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)
upper secondary	1.084	1.086	1.084	1.084	1.085	1.086
	(0.117)	(0.117)	(0.117)	(0.117)	(0.117)	(0.117)
post-secondary	1.097	1.100	1.098	1.097	1.098	1.101
	(0.121)	(0.121)	(0.121)	(0.121)	(0.121)	(0.121)
first stage tertiary	1.161	1.164	1.163	1.161	1.162	1.166
	(0.125)	(0.126)	(0.126)	(0.125)	(0.125)	(0.126)
second stage tertiary	1.253*	1.257*	1.254*	1.254*	1.253*	1.261*
	(0.152)	(0.153)	(0.152)	(0.152)	(0.152)	(0.153)
working	3.696***	3.700***	3.700***	3.696***	3.699***	3.702***
	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)
network	2.303***	2.303***	2.303***	2.302***	2.303***	2.303***
	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)
opportunity	1.590***	1.589***	1.589***	1.590***	1.591***	1.589***
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
fear of failure	0.672***	0.672***	0.672***	0.672***	0.672***	0.672***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
entrepreneurial confidence	4.031***	4.025***	4.023***	4.031***	4.030***	4.020***
	(0.112)	(0.112)	(0.112)	(0.112)	(0.112)	(0.112)
Fixed part						
intercept (γ_{00})	0.059***	0.256	0.031***	0.063***	0.048***	0.082**
	(0.033)	(0.228)	(0.024)	(0.036)	(0.031)	(0.085)
Variance components						
random intercept variance (var(u_{0j}))	1.181***	1.168***	1.194***	1.182***	1.180***	1.176***
	(0.040)	(0.040)	(0.047)	(0.043)	(0.043)	(0.043)
random slope variance (var(u_{1j}))	1.060***	1.043***	1.032**	1.061***	1.065***	1.028**
	(0.018)	(0.017)	(0.014)	(0.020)	(0.022)	(0.012)

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 104,050
Countries *K* (level 2 groups) = 45
OR > 1 represents a positive relationship, whereas OR < 0 represents a negative relationship.

4.2. Robustness analyses

4.2.1. Alternative measure for culture

Four main approaches are used in the entrepreneurship literature to operationalize national culture empirically: Global Leadership and Organizational Behavior Effectiveness (GLOBE) Project which investigates nine cultural dimensions in social life; Schwartz's Survey of Values which uses seven values for intercultural comparison; World Values Survey which analyzes the variety of people's values and beliefs; and Hofstede's cultural dimensions' framework which studies six aspects of culture that affect individuals' behavior (Estrada-Cruz et al., 2019; Laskovaia et al., 2017). Hofstede's cultural dimensions are widely cited in literature and frequently used to operationalize national culture empirically (Jones, 2007). However, some arguments run against his work (e.g., Jones, 2007; McSweeney, 2002). Hofstede agrees with the argument that these are too few dimensions to provide sufficient information about cross-cultural differences and he encourages expansion of his work by including additional dimensions (Hofstede, 1998). The GLOBE Project added few dimensions to Hofstede's work and split up some of Hofstede's cultural dimensions in less broad dimensions. The GLOBE Project's cultural practice scores represent Hofstede's cultural dimensions to a large extent and are used in order to see whether the estimates of the regression results show comparable results.

The GLOBE's Project collected data from over 17,000 managers across 951 organizations in 62 nations between 2000 and 2004 (House et al., 2002). The aim of the project was to expand Hofstede's (2001) work by providing additional and more recent knowledge relevant for research on cultural values across countries (Shi & Wang, 2011). The GLOBE Project split the individualism versus collectivism dimension into institutional collectivism and in-group collectivism. In-group collectivism indicates the extent to which individuals reveal cohesiveness, loyalty, and pride in the groups they belong to and how much they depend on these groups (Bullough et al., 2017). Institutional collectivism indicates to what extent a society's group loyalty and cohesion rather than individual achievement is encouraged and rewarded through formal and informal institutions (Bullough et al., 2017). Therefore, in-group collectivism aligns most with Hofstede's individualism dimension (House et al., 2002). GLOBE researchers split the masculinity versus femininity dimension into two components: assertiveness and gender egalitarianism (House et al., 2002). Assertiveness reflects the degree to which individuals are assertive and confrontational towards other individuals in situations (House et al., 2002). Gender egalitarianism reflects the extent to which a society minimizes gender inequality (House et al., 2002). Dheer et al. (2019) used gender egalitarianism as a proxy for the cultural dimension masculinity. However, both components are included in the model

since together they represent Hofstede's masculinity dimension to the most considerable extent (House et al., 2002). GLOBE's power distance and uncertainty avoidance intend to reflect the same construct as Hofstede's dimension. The dimensions are rated on a 7-point Likert-type scale that range from low to high (House et al., 2002). Following the previous hypotheses development, I expect a positive moderating effect for assertiveness; and a negative moderating effect for in-group collectivism, uncertainty avoidance, gender egalitarianism, and power distance. Regarding gender egalitarianism, the theoretical assertion of Dheer et al. (2019) and Klyver et al. (2013) that women do not experience the same workplace discrimination in feminine societies as in masculine societies and therefore are less motivated to initiate self-employment is followed. The original model becomes:

$$TEA_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j})female_{ij} + \gamma_{20}\mathrm{X}_{ij} + \gamma_{01}powerdistanceGLOBE_j + \gamma_{02}individualismGLOBE_j + \gamma_{03}genderegalitarianismGLOBE_j + \gamma_{04}assertivenessGLOBE_j + \gamma_{05}uncertaintyavoidanceGLOBE_j + \gamma_{06}\Psi_j + \gamma_{11}(female_{ij} * powerdistanceGLOBE_j) + \gamma_{22}(female_{ij} * individualismGLOBE_j) + \gamma_{33}(female_{ij} * genderegalitarianismGLOBE_j) + \gamma_{44}(female_{ij} * assertivenessGLOBE_j) + \gamma_{55}(female_{ij} * uncertaintyavoidanceGLOBE_j) + u_{0j} \quad (8)$$

Table 14 in Appendix I shows the replicate of the original full model with different measurements for Hofstede's criticized cultural dimensions. Table 15 in Appendix I shows the corresponding odds ratios. Due to data limitations, the sample used for the regression results of the model with the GLOBE Project's cultural practices consists of 33 countries, see Appendix J for the list of countries included in the sample.

When comparing the inferences made from the results of Table 14 and 15 depicted in Appendix I with the inferences made from the results of Table 12 and Table 13, I find both corresponding and differing inferences. The estimates of the cross-level interaction term between *female* and *power distance GLOBE* in Table 14 Model 1 and *female* and *power distance* in Table 12 Model 2 are both statistically significant ($p < 0.01$) and positive ($\beta = 0.362$; $\beta = 0.005$, respectively). The odds ratio in Table 15 Model 1 indicates that for a one-unit increase in *power distance GLOBE,* being female compared to being male increases the odds of *TEA* being "1" by 43.60% ($p < 0.01$). Thus, *power distance* has a positive and significant moderating effect in both models, which is contradictory with H2. The estimates for the cross-level interaction term between *female* and *in-group collectivism GLOBE* in Table 14 Model 2 and between *female* and *individualism* in Table 12 Model 3 are both statistically significant (*p*

< 0.05; $p < 0.01$, respectively). The sign of the cross-level interaction term between *female* and *in-group collectivism GLOBE* is positive (β = 0.160), which corresponds to the negative sign (β = -0.006) belonging to the cross-level interaction term between *female* and *individualism*. The odds ratio in Table 15 Model 2 indicates that for a one-unit increase in *in-group collectivism GLOBE,* being female compared to being male increases the odds of *TEA* being "1" by 17.40% ($p < 0.05$). Therefore, *in-group collectivism GLOBE* has a positive and significant moderating effect on the relationship between *female* and *TEA*, and *individualism* has a negative and significant moderating effect on the relationship between *female* and *TEA*, which is contradictory with H3. The estimate of the cross-level interaction term between *female* and *masculinity* in Table 12 Model 4 is statistically insignificant, as is the estimate for the cross-level interaction term between *female* and *assertiveness* in Table 14 Model 4. The estimate of the cross-level interaction term between *female* and *uncertainty avoidance* in Table 12 Model 5 is statistically insignificant, as is the estimate for the interaction term between *female* and *uncertainty avoidance GLOBE* in Table 14 Model 5. Indicating that in the model using GLOBE cultural practices there is no evidence for a moderating effect of a country's level of masculinity or uncertainty avoidance on the relationship between being female compared to being male and the probability of being involved in entrepreneurial activity. However, Table 14 Model 3 depicts a significant ($p < 0.05$) and negative (β = -0.311) estimate for the cross-level interaction term between *female* and *gender egalitarianism GLOBE*. The odds ratio in Table 15 Model 3 indicates that for a one-unit increase in *gender egalitarianism GLOBE* being female compared to being male decreases the odds of *TEA* being "1" by 26.70% (1 – 0.733; $p < 0.05$). The negative and significant moderating effect of *gender egalitarianism GLOBE* in Table 14 and Table 15 Model 3 supports the theoretical assertion of Dheer et al. (2019) and Klyver et al. (2013). Table 14 Model 6 shows the results of the conducted joint analysis which evaluates all moderation effects within one regression model. The cross-level interaction term between *female* and *gender egalitarianism GLOBE* stays significant ($p < 0.1$) and negative (β = -0.257). The odds ratio in Table 15 Model 6 indicates that for a one-unit increase in *gender egalitarianism GLOBE* being female compared to being male decreases the odds of *TEA* being "1" by 22.70% (1 – 0.773; $p < 0.1$). Therefore, when incorporating all cultural practices into the model, *gender egalitarianism GLOBE* has a negative and significant moderating effect on the relationship between *female* and *TEA.* Regarding the conducted joint analysis depicted in Table 12 Model 6, the cross-level interaction term between *female* and *individualism* stays significant ($p < 0.01$) and negative (β = -0.006).

4.2.2. Alternative sample

28.51% of thesample includes data from Chile (6.87%), Spain (16.32%), and the United Kingdom (6.20%). In order to see whether the regression results are driven by the data from these three countries I eliminated the data of Chile, Spain, and the United Kingdom of the sample. The findings using the sample without Chile, Spain, and the United Kingdom are reported in Table 16 in Appendix K. The sample consisting of 42 countries instead of 45 countries provides substantively similar regression results as the sample used for the regression results depicted in Table 12. Therefore, it is concluded that the results are not driven by data of these three countries.

4.3. Variance components analysis

It is worth noting that adding more variables to the model results in the reduction of the random intercept variance. This is due to the fact that there are less unexplained variations of the odds of an individual being involved in entrepreneurial activity from one country to another, since the variables incorporated in the model account for part of these variations. The variance component of the random intercept decreased from 0.271 in the null model depicted in Table 9 in Appendix G to 0.174 in Model 1 Table 14. This suggests that the control variables incorporated in the model explain 35.79% (((0.271 – 0.174)/0.271) * 100) of the between country variance in *TEA*. In addition, the variance component of the random intercept decreased from 0.271 in the null model depicted in Table 9 in Appendix G to 0.162 in the final model including all variables in Table 12, suggesting that 40.22% (((0.271 – 0.162)/0.271)*100) of the total between country variance in *TEA* is explained by all the independent variables incorporated into the model. Moreover, the variance component of the random intercept decreased from 0.174 in Model 1 of Table 14 to 0.148 in Model 7 of Table 14, suggesting that 14.94% (((0.174 – 0.148)/0.174)*100) of the remaining between country variance (after accounting for the control variables) in *TEA* is explained by the four cultural dimensions. In addition, it indicates that the four cultural dimensions collectively explained 9.60% (((0.174 – 0.148)/0.271)*100) of the total between country variance in individual-level involvement in entrepreneurial activity. The variance component of the random intercept decreased from 0.166 in Model 1 of Table 12 to 0.162 in Model 6 of Table 12, suggesting that 2.41% (((0.166 – 0.162)/0.166)*100) of the between country variance in *TEA* is explained by the four cross-level interaction terms. The variance component of the random intercept of Model 6 in Table 14 shows that the cross-level interaction terms between *female* and GLOBE's cultural practice

scores account for 26.51% (((0.166 – 0.122)/0.166)*100) of the between country variance in *TEA*.

Likewise, adding cross-level interaction terms to the model may result in the reduction of the random slope variance of *female*. This is due to the fact that there are less unexplained variations in the effect of *female* from one country to another, since the variables incorporated into the model account for part of these variations. When running a multilevel model with *female* as only explanatory variable and allowing for random slopes, the random slope variance is 0.054, indicating that the total between country variance in the relationship between *female* and *TEA* is 5.4%. The variance component of the random slope decreased from 0.059 in Model 1 of Table 12 to 0.028 in Model 6 of Table 12, suggesting that 52.54% (((0.059 – 0.028)/0.059)*100) of the remaining (after accounting for the control variables) between country variance in the effect of *female* on *TEA* is explained by the four cross-level interaction terms. In addition, the four cross-level interaction terms collectively explained 57.41% (((0.059 – 0.028)/0.054)*100) of the total between-country variance in the effect of *female*. The variance component of the random slope of Model 6 in Table 14 shows that the cross-level interaction terms between *female* and GLOBE's cultural practice scores account for 42.37% (((0.059 – 0.034)/0.059)*100) of the between country variance in the effect of *female* on *TEA*.

5. Conclusion and discussion

Over the last few decades, cross-national research on the entrepreneurial gender gap has steadily increased. However, there is a lack of research explaining the entrepreneurial gender gap in the contextual environment in which entrepreneurial activity takes place. Entrepreneurial behavior is put into practice by individuals who are embedded in a sociocultural context (Autio et al., 2013). This sociocultural context is cultivated by society and at the same time is cultivating the society, indicating that the cultural context is a dynamic rather than static force (Bullough et al., 2017). It forms individuals' values, beliefs, and subsequently behavior and thus should not be neglected when analyzing female entrepreneurial activity. This research contributes to closing the gap within literature by theoretically and empirically analyzing how this sociocultural environment characterized by cultural values explains the entrepreneurial gender gap. To my knowledge, the moderating effect of the cultural values power distance, individualism, masculinity, and uncertainty avoidance on the relationship between an individual's entrepreneurial activity and its gender is not yet researched. Specifically, this research uses a multilevel logistic model with random slopes to allow the effect of being a female on the odds of being involved in entrepreneurial activity to vary across countries.

Thereby this research supports the use of multilevel logistic models with random slopes in the field of cross-cultural female entrepreneurial activity research.

Five hypotheses regarding female entrepreneurial activity and the moderating effect of cultural dimensions are explored using data from GEM 2016, Hofstede, and The World Bank 2015. Empirical support for the hypothesis that females are less likely to engage in entrepreneurial activity across nations is found. According to literature, next to differences between female and male perceptional factors, this negative relationship is due to the socio-cultural context in which females are embedded. However, the estimates of the cross-level interaction terms used to explain the moderating effect of a society's cultural values and beliefs proxied by Hofstede's four cultural dimensions on the relationship between being female and being involved in entrepreneurial activity show weak association or are insignificant. The estimates of the lower-level direct effects, especially the individual perceptional factors, i.e., *network, opportunity, fear of failure*, and *entrepreneurial confidence*, show a relatively strong association with the odds of being involved in entrepreneurial activity. It could be interesting for future research to investigate how these individual perceptions, which differ between men and women, influence the choice of involvement in entrepreneurial activity across different cultural values using a multilevel model.

An explanation for the unexpected positively moderating effect of *power distance*, Table 12 Model 2, is that females in high power distant societies move away from the societal institutions and organizations in which they do not have the same level of power as males by setting up a business for themselves. Women often face "glass ceilings" in firms (Joshi et al., 2015). Meaning that women are underrepresented at the highest levels in organizations and often receive lower pays and fewer promotions than men (Van Vianen & Fischer, 2002). Therefore, employment is more favorable for men because better incentives and future perspectives are offered (Dheer et al., 2019). Women in high power distant societies face workplace segregation to a higher extent than women in low power distant societies due to a higher power imbalance. Even though high power distant societies consider inequality to be an inherent feature of society, women might want to escape the male-dominated culture in organizations. Setting up a business and being own boss is an opportunity to escape the masculine-gendered business environment. This explanation for the positive effect of power distance on female entrepreneurial activity is in line with the dissatisfaction view of entrepreneurship which assumes that individuals are not satisfied within the existing organizational structures and prefer self-employment (Wennekers et al., 2002; Hofstede et al., 2004; Baum et al., 1993). An explanation for the negatively moderating effect of *individualism*,

Table 12 Model 3, is the argument by Bullough et al. (2017) that resources provided by the tightly knit groups in collectivistic societies encourage and support women getting involved in entrepreneurial activity. Another explanation could lie in the argument that the gender stereotyping of females as the primary caregiver for the family is strengthened by the collectivistic society. Males are seen as breadwinners, whereas females are seen as responsible for housework and caring for children. Being able to schedule independent from an employer provides women with the freedom and autonomy to take care of their childcare and housework responsibilities and at the same time earn money for the family (Wankel, 2008). Even though time spent caring for children has a negative effect on entrepreneurship effort and the years of existence of new businesses, balancing work and caregiver responsibilities is a motivation for women to get involved in entrepreneurial activity (Williams, 2004).

Contrary to expectations, the cultural dimensions masculinity and uncertainty avoidance have no statistically significant effect on the relationship between being female and being involved in entrepreneurial activity in the model. Dheer et al. (2019) did find a statistically significant moderating effect of masculinity on the relationship between being female and the likelihood of starting a new venture. Their results provide evidence that the gender gap in starting new ventures is smaller in masculine than in feminine nations. Their evidence suggests that women's motivation for entrepreneurship is stimulated in masculine countries. To my knowledge, no research exists explaining the moderating effect of uncertainty avoidance on the relationship between entrepreneurial activity and gender. However, the widespread evidence of the positive effect of uncertainty tolerance on entrepreneurial activity in cross-cultural entrepreneurship literature suggests a negative moderating effect for uncertainty avoidance on the relationship between entrepreneurial activity and gender (McGrath et al., 1992; Mueller & Thomas, 2001).

The insignificant estimates might be due to the difference in the direction of the moderating effect of the cultural dimensions on the relationship between gender and the probability of being involved in entrepreneurial activity across countries. For example, in certain countries high levels of masculinity might work as an external motivation for females to get involved in entrepreneurial activity given the context in which they are embedded. However, in other countries it might work discouraging. This argument touches upon the ambiguousness of cross-cultural entrepreneurial activity research. Not neglecting that investigating the sociocultural context in which individuals are embedded is of importance for this stream of research. However, the diverging set of factors forming a country's sociocultural context and the values and beliefs of individuals regarding entrepreneurial activity makes cross-

national comparison questionable. Separately investigating countries' sociocultural context and its effect on female entrepreneurial activity might be more clarifying for policy makers and could be interesting for future research.

Abundant cross-cultural entrepreneurship research exists in which different and surprising results have been obtained (Çelikkol et al., 2019). This ambiguity might be due to the fact that more than 164 definitions of the word "culture" exist, which makes the concept difficult to define (Jones, 2007). Section 4.1. reveals that different measurements of the concept culture leads to different estimation results and subsequently different inferences. Even though Hofstede (2001) claims that cultural dimension scores are time independent and should be seen as climate data, rather than share prices, his work is relatively old. Taking into account that the world is changing rapidly due to globalization, internationalization and immigration, it is important to compare Hofstede's cultural dimensions with different, newer sources of cultural dimensions when executing cross-cultural research, e.g. GLOBE Project, Schwartz's Survey of Values, World Values Survey. Therefore, a thorough comparison of the existing cultural dimension scores is needed in order to reduce this bias and to understand a country's multifaceted culture. However, it is important to note that the answers to surveys can be influenced by mood or contextual factors such as a respondent's cultural background, which in turn might bias the outcomes that form cultural dimension scores (Bertrand & Mullainathan, 2001). Another limitation regarding the concept culture and its use in cross-cultural research is that the cultural heterogeneity within countries is not taken into account (Dheer et al., 2015; Hanel et al., 2018). For example, differences in the values and beliefs might exist between people living in cities and people living at the countryside. This cultural heterogeneity within nations implicates that countries and their regions should be researched separately in order to get a thorough understanding of their contextual environment and its impact on the rate of female entrepreneurial activity.

Furthermore, a limitation of the empirical analysis is the rather small number of country-level units in the sample. The sample exists of 104,050 level-1 units and 45 level-2 units. Hofstede provides cultural dimension data for a maximum of 111 countries. GEM's APS of 2016 contains data of individuals across 65 countries. However, combining both datasets results in a sample of 45 countries. According to Schoeneberger (2016) a minimum of 50 level-1 units, i.e. individual level observations, and 40 level-2 units, i.e. country level observations, are needed when using multilevel logistic modelling. However, when estimating cross-level interaction effects Schoeneberger (2016) recommends using a sample with a minimum of 100 level-1 and 80 level-2 units. Regarding the level-2 units the sample size fails to comply this

threshold. Maas & Hox (2004) recommend the use of 30 groups if contextual effects are of interest in the research. They do recommend the use of 50 groups for correct estimates of the standard errors. I proceeded the research by using a multilevel logistic model because the ICC shows that the outcome variable varies between clusters and additional statistical tests supported the use of a multilevel model. In addition, I wanted to account for the dependence that exists between the individual observations within a country by using a multilevel model. However, insufficient sample size reduces the probability of detecting a true effect, i.e. statistical power. Therefore, Type I errors might occur, and wrong inferences could be made regarding the effect of independent variables on the dependent variable. Sommet & Morselli (2017) recommend doing a Monte Carlo simulation when the sample size is questionable in order to detect the bias in regression coefficients and standard errors. Running a Monte Carlo simulation is beyond the scope of this research but could be considered for future research.

Another limitation regarding the empirical analysis pertains the statistical software used. The model allows for the random slope of the independent variable of interest *female* because its effect on the probability of being involved in entrepreneurial activity is expected to depend – to some extent – on country characteristics. In addition, it improved the fit of the model compared to the model without random slopes. However, it might be the case that the relationship between other independent variables and the dependent variable are different between countries as well. Nevertheless, allowing for the random slopes of more than one explanatory variable leads to failure of convergence. Even though the use of maximal model estimation - which tests for the random slope variance of all individual level parameters - is criticized (Bates et al., 2015), having the option to investigate the effect of allowing for more than one random slope in the model could improve the research (Barr et al., 2013). Another limitation regarding the statistical software is the inability to calculate the correct cross-level interaction effect for the multilevel logistic model. Some researchers argue that the sign, the value, and the significance of the estimate of the cross-level interaction term in a logistic model are likely to be biased because they do not correspond mathematically to the cross-level interaction effect (Sommet & Morselli, 2017). These researchers recommend the use of a statistical package to calculate the correct cross-level interaction effect (Norton et al., 2004). However, for the cross-level interaction effect in a multilevel logistic model the cross-partial derivative should be calculated which is very complex and for which no statistical package is available yet (Sommet & Morselli, 2017). Being able to calculate the correct cross-level interaction effect using a statistical package would increase the validity and reliability of the

inferences. Therefore, the use of statistical software which is able to do so is recommended for future research.

It is concluded that the gap between females and males being involved in entrepreneurial activity is a multifaceted gap arising from abundant cross-national and intra-national differences (Minniti, 2009). Covering all determinants of this gap is beyond the scope of our, and presumably every, research. However, even though the empirical results show little evidence, the institutionalized values and beliefs societies have regarding gender roles are determinants of the entrepreneurial gender gap since they are not in favor of female entrepreneurial activity. I agree with the statement by Birley (2001) that *"there is no dichotomy between entrepreneurs and non-entrepreneurs; with the right stimulus, the most unexpected people can become entrepreneurs"* (Wright, 2001, p. 37-38). According to the view of society and considering the gender heterogeneity in personality traits, the more unexpected people becoming entrepreneurs are females rather than males. The right stimulus is argued to be a supportive environment for female entrepreneurship.

One thing becomes evident after reviewing the literature on these gender stereotypes and other factors determining the entrepreneurial gender gap: until we think of men and women as both caregivers and breadwinners, we are not able to close the entrepreneurial gender gap. I hope that this research stimulates research concerning the subordinate role of females in societies and especially in the entrepreneurship environment. Policymakers need to generate knowledge on the sociocultural factors that establish values and beliefs that are not in support of female entrepreneurial activity. Also, to increase female entrepreneurship, it is essential to investigate under which contextual environment conditions females flourish as entrepreneurs. Research is needed to examine these sociocultural factors and conditions while using multilevel models. Thereafter, policy implications should be based on the outcomes in order to close the gap between female and male entrepreneurs once and for all.

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Appendix A: list of countries in sample

1. Argentina
2. Australia
3. Austria
4. Brazil
5. Bulgaria
6. Canada
7. Chile
8. China
9. Colombia
10. Croatia
11. El Salvador
12. Estonia
13. Finland
14. France
15. Germany
16. Greece
17. Hungary
18. India
19. Indonesia
20. Iran
21. Ireland
22. Israel
23. Italy
24. Latvia
25. Luxembourg
26. Malaysia
27. Mexico
28. Morocco
29. Netherlands
30. Peru
31. Poland
32. Portugal
33. Russia

34. Slovakia
35. Slovenia
36. South Korea
37. Spain
38. Sweden
39. Switzerland
40. Thailand
41. Turkey
42. United Arab Emirates
43. United Kingdom
44. United States
45. Uruguay

Appendix B: pairwise correlations

Table 2. Pairwise correlations.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) TEA	1.000												
(2) female	-0.061***	1.000											
(3) power distance	0.014***	0.003	1.000										
(4) individualism	-0.076***	-0.005	-0.672***	1.000									
(5) masculinity	-0.046***	0.000	-0.108***	0.300***	1.000								
(6) uncertainty avoidance	0.005	0.014***	0.194***	-0.402***	-0.289***	1.000							
(7) age	-0.057***	0.014***	-0.098***	0.099***	-0.004	0.022***	1.000						
(8) age squared	-0.066***	0.015***	-0.097***	0.099***	-0.003	0.021***	0.989***	1.000					
(9) education pre-primary	-0.015***	0.027***	0.053***	-0.042***	-0.023***	-0.005	0.074***	0.077***	1.000				
(10) education primary	-0.034***	0.022***	0.080***	-0.067***	-0.040***	0.100***	0.156***	0.159***	-0.039***	1.000			
(11) education lower secondary	-0.041***	-0.006*	0.083***	-0.025***	0.086***	0.016***	0.026***	0.030***	-0.056***	-0.141***	1.000		
(12) education upper secondary	-0.004	-0.020***	-0.033***	-0.047***	0.025***	-0.037***	-0.080***	-0.073***	-0.087***	-0.219***	-0.311***	1.000	
(13) education post-secondary	0.012***	-0.001	-0.024***	0.037***	-0.038***	-0.005*	-0.026***	-0.028***	-0.048***	-0.121***	-0.172***	-0.268***	1.000
(14) education first stage tertiary	0.046***	0.007**	-0.097***	0.092***	-0.043***	-0.047***	-0.044***	-0.054***	-0.072***	-0.181***	-0.257***	-0.399***	-0.221***
(15) education second stage tertiary	0.030***	-0.006*	0.032***	0.022***	0.010***	0.036***	0.012***	0.006*	-0.020***	-0.051***	-0.072***	-0.112***	-0.062***
(16) working	0.160***	-0.164***	-0.075***	0.047***	0.014***	-0.066***	-0.001	-0.044***	-0.067***	-0.115***	-0.058***	-0.016***	0.036***
(17) network	0.198***	-0.068***	0.063***	-0.083***	-0.020***	-0.028***	-0.084***	-0.093***	-0.033***	-0.079***	-0.033***	0.005	0.005*
(18) opportunity	0.161***	-0.044***	-0.080***	0.019***	-0.027***	-0.096***	-0.062***	-0.064***	-0.009***	-0.061***	-0.056***	-0.002	0.015***
(19) fear of failure	-0.104***	0.065***	-0.013***	0.019***	0.010***	0.028***	-0.003	-0.008***	0.001	0.024***	0.010***	-0.003	-0.021***
(20) entrepreneurial confidence	0.248***	-0.115***	-0.007**	-0.050***	-0.045***	0.043***	0.021***	0.005*	-0.022***	-0.056***	-0.054***	-0.017***	0.018***
(21) log GDP per capita	-0.068***	-0.012***	-0.681***	0.671***	0.118***	-0.079***	0.142***	0.138***	-0.114***	-0.062***	-0.079***	-0.022***	0.061***
(22) GDP per capita growth	-0.027***	-0.007*	0.025***	0.044***	0.133***	-0.280***	0.003	-0.001	-0.002	0.019***	0.033***	-0.052***	0.016***
(23) unemployment	-0.085***	0.001	-0.012***	0.082***	-0.178***	0.442***	0.071***	0.067***	-0.020***	0.154***	0.012***	-0.068***	0.011***

* shows significance at the 0.1 level ($p < 0.1$)

** shows significance at the .05 level ($p < 0.05$)

*** shows significance at the .01 level ($p < 0.01$)

Table 2. Continued.

Variable	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(1) TEA										
(2) female										
(3) power distance										
(4) individualism										
(5) masculinity										
(6) uncertainty avoidance										
(7) age										
(8) age squared										
(9) education pre-primary										
(10) education primary										
(11) education lower secondary										
(12) education upper secondary										
(13) education post-secondary										
(14) education first stage tertiary	1.000									
(15) education second stage tertiary	-0.092***	1.000								
(16) working	0.114***	0.054***	1.000							
(17) network	0.068***	0.037***	0.127***	1.000						
(18) opportunity	0.077***	0.014***	0.091***	0.211***	1.000					
(19) fear of failure	-0.006*	0.000	-0.028***	-0.034***	-0.089***	1.000				
(20) entrepreneurial confidence	0.079***	0.042***	0.143***	0.239***	0.181***	-0.145***	1.000			
(21) log GDP per capita	0.123***	-0.014***	0.095***	-0.074***	-0.002	0.013***	-0.054***	1.000		
(22) GDP per capita growth	0.010***	-0.016***	-0.008**	-0.002	-0.002	-0.003	-0.021***	0.026***	1.000	
(23) unemployment	-0.034***	-0.021***	-0.113***	-0.056***	-0.143***	0.068***	-0.014***	0.176***	0.123***	1.000

* shows significance at the 0.1 level ($p < 0.1$)

** shows significance at the .05 level ($p < 0.05$)

*** shows significance at the .01 level ($p < 0.01$)

Appendix C: VIF scores

Table 3. VIF scores.

	(1)		(2)		(3)	
Variable	**VIF**	**1/VIF**	**VIF**	**1/VIF**	**VIF**	**1/VIF**
female	1.046	0.956	1.046	0.956	1.045	0.957
power distance	2.363	0.423	2.363	0.423	2.335	0.428
individualism	3.244	0.308	3.244	0.308	3.177	0.315
masculinity	1.228	0.815	1.228	0.815	1.209	0.827
uncertainty avoidance	2.133	0.469	2.133	0.469	2.108	0.474
age[4]	50.189	0.020	50.189	0.020	50.033	0.020
age squared[1]	50.233	0.020	50.233	0.020	50.086	0.020
education[5]						
pre-primary	1.623	0.616	-	-	-	-
primary	4.312	0.232	6.377	0.157	-	-
lower secondary	6.445	0.155	10.127	0.099	-	-
upper secondary	9.614	0.104	15.54	0.064	-	-
post-secondary	5.4	0.185	8.512	0.117	-	-
first stage tertiary	8.268	0.121	13.507	0.074	-	-
second stage tertiary	-	-	2.654	0.377	-	-
working	1.201	0.833	1.201	0.833	1.184	0.844
network	1.128	0.887	1.128	0.887	1.122	0.891
opportunity	1.112	0.899	1.112	0.899	1.11	0.901
fear of failure	1.036	0.965	1.036	0.965	1.036	0.966
entrepreneurial confidence	1.149	0.870	1.149	0.870	1.141	0.876
log GDP per capita	2.522	0.397	2.522	0.397	2.455	0.407
GDP per capita growth	1.261	0.793	1.261	0.793	1.255	0.797
unemployment	1.706	0.586	1.706	0.586	1.676	0.597
mean VIF	**7.486**	-	**8.489**	-	**8.065**	-

[4] The relatively high VIFs for *age* and *agesquared* can be ignored because *agesquared* is a nonlinear quadratic function of *age* and therefore multicollinearity is not a problem between those two variables. The mean VIF decreases substantially without *age* and *agesquared* in the regression.

[5] *education* is a categorical variable including constructive categories and therefore the categories within *education* are likely to behave co-linear. However, the VIF scores of the other variables hardly change when switching from base category or when not including *education* at all in the regression. Therefore, the relatively high scores are not a concern.

Appendix D: overview of control variables

Table 4. Control variables incorporated in the model with description and source.

Control variables	Description	Source
Individual level control variables		
Age	Individual's current age in years, ranging from 18 to 64. Continuous variable.	GEM 2016 APS Global - Individual Level Data
Age squared	Individual's current age in years squared. Continuous variable.	GEM 2016 APS Global - Individual Level Data
Education	Individual's highest level of education completed. Categorical variable. Based on United Nations harmonized educational attainment scheme: 1. Pre-primary education (1,590 observations) 2. Primary education of first stage or first stage of basic education (9,379 observations) 3. Lower secondary or second stage of basic education (17,320 observations) 4. (Upper) secondary education (33,934 observations) 5. Post-secondary non tertiary education (13,409 observations) 6. First stage of tertiary education (25,791 observations) 7. Second stage of tertiary education (2,627 observations).	GEM 2016 APS Global - Individual Level Data
Working	Individual's work status. Binary variable (working = 1; not working = 0). Based on GEM's harmonized work status scheme: 1. Full or part time work (47,960 observations) 2. Part time work only (9,866 observations) 3. Retired or disabled (6,360 observations) 4. Homemaker (7,522 observations) 5. Student (5,125 observations) 6. Not working (9,910 observations) 7. Self-employed (17,307 observations) Divided into working and not working: 1. Working = full or part time work, part time work only, self-employed (75,133 observations) 2. Not working = retired or disabled, homemaker, student, not working (28,917 observations)	GEM 2016 APS Global - Individual Level Data

Table 4. Continued.

Control variables	Description	Source
Individual level control variables		
Network	Individual's answer (yes/no) to question: *"Do you know someone personally who started a business in the past 2 years?"* Binary variable (yes = 1, no = 0).	GEM 2016 APS Global - Individual Level Data
Opportunity	Individual's answer (yes/no) to question: *"In the next six months, will there be good opportunities for starting a business in the area where you live?"* Binary variable (yes = 1, no = 0).	GEM 2016 APS Global - Individual Level Data
Fear of failure	Individual's answer (yes/no) to question: *"Would fear of failure prevent you from starting a business?"* Binary variable (yes =1, no = 0).	GEM 2016 APS Global - Individual Level Data
Entrepreneurial confidence	Individual's answer (yes/no) to question: *"Do you have the knowledge, skill and experience required to start a new business?"* Binary variable (yes = 1, no = 0).	GEM 2016 APS Global - Individual Level Data
Country level control variables		
GDP per capita	Country's gross domestic product per capita depicted in current US dollars.	The World Bank: World Development Indicators Database 2015
GDP per capita growth	Country's gross domestic product per capita annual percentage growth.	The World Bank: World Development Indicators Database 2015
Unemployment	Country's unemployment rate. Depicts the number of individuals without work but available for and seeking employment as percentage of the total labor force.	The World Bank: World Development Indicators Database 2015

Appendix E: results proportion test individual perceptual factors

Table 5. Observations *network* by gender and result proportion test.

Do you know someone personally who started a business in the past two years?	*What is your gender?*		Total	Proportion test on the equality of proportions shows that females are less likely to know someone personally who started a business in the past two years than men. The difference is statistically significant at the 1% significance level ($p < 0.001$).
	Male	**Female**		
No	30,218	32,936	63,154	
Yes	22,420	18,476	40,896	
Total	52,638	51,412	104,050	

Table 6. Observations *opportunity* by gender and result proportion test.

In the next six months will there be good opportunities for starting a business in the area you live?	*What is your gender?*		Total	Proportion test on the equality of proportions shows that females are less likely to see good opportunities for starting a business in the next six months in the area they live than men. The difference is statistically significant at the 1% significance level ($p < 0.001$).
	Male	**Female**		
No	31,521	33,001	64,522	
Yes	21,117	18,411	39,528	
Total	52,638	51,412	104,050	

Table 7. Observations *fear of failure* by gender and result proportion test.

Would fear of failure prevent you from starting a business?	*What is your gender?*		Total	Proportion test on the equality of proportions shows that females are more likely to let fear of failure prevent them from starting a business than men. The difference is statistically significant at the 1% significance level ($p < 0.001$).
	Male	**Female**		
No	31,595	27,563	59,158	
Yes	21,043	23,849	44,892	
Total	52,638	51,412	104,050	

Table 8. Observations *entrepreneurial confidence* by gender and result proportion test.

Do you have the knowledge, skill and experience required to start a new business?	*What is your gender?*		Total	Proportion test on the equality of proportions shows that females are less likely to have the knowledge, skill and experience required to start a new business. The difference is statistically significant at the 1% significance level ($p < 0.001$).
	Male	**Female**		
No	23,533	28,895	52,428	
Yes	29,105	22,517	51,622	
Total	52,638	51,412	104,050	

Appendix F: mean centering variables

Grand-mean centering subtracts the general full sample mean of the independent variable from the individual's value of that variable; cluster-mean centering subtracts the country-specific mean of the independent variable from the individual's value of that variable (Paccagnella, 2006). According to Enders & Tofighi (2007) and Hancock et al. (2010), researchers often make the mistake to base their centering decision on statistical reason rather than on the essential question of interest. Regarding the lower-level direct effect of interest of gender on an individual's entrepreneurial activity it is suggested that centering at the grand mean is the most appropriate choice. For the cross-level interaction effect of interest of cultural dimensions on the relationship between gender and an individual's entrepreneurial activity, centering within cluster of the individual level variable would be the most appropriate choice for an unbiased estimate of the individual-level association (Hancock et al., 2010; Sommet & Morselli, 2017). However, abundant contradictory evidence exist that mean centering variables is not essential when conducting a multilevel analysis (Echambadi & Hess, 2007; Franzese & Kam, 2009; Kromrey & Foster-Johnson, 1998). Echambadi & Hess (2007) compare analytical results of uncentered models and mean centered models and conclude that the latter does not change the computational precision of parameters, the sampling accuracy of the main effects, simple effects, interaction effects, or the overall explanatory power of the model. Concluding that mean centering variables "*does not hurt, but it does not help"* (Echambadi & Hess, 2007, p. 439). Kelley et al. (2017) even argue that cluster-mean centering often substantially distorts regression results and leads to incorrect interpretations of estimates, they recommend abandoning cluster-mean centering.

Appendix G: results of the null model

Table 9. Regression results of the empty multilevel logistic model.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	Null model
Fixed part	
Intercept (γ_{00})	-2.110***
	(0.077)
Variance component	
random intercept variance (var(u_{0j}))	0.271***
	(0.058)
ICC	0.076

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 104,050
Countries *K* (level 2 groups) = 45

Appendix H: results of the constrained and augmented intermediate model

Table 11. Regression results of the constrained and augmented intermediate model.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	CIM	AIM
Individual level independent variable		
female	-0.069***	-0.109**
	(0.022)	(0.043)
Country-level independent variables		
power distance	-0.009**	-0.010**
	(0.004)	(0.004)
individualism	-0.003	-0.003
	(0.004)	(0.004)
masculinity	-0.000	-0.001
	(0.003)	(0.003)
uncertainty avoidance	-0.000	0.001
	(0.004)	(0.003)
Country-level control variables		
logarithm GDP per capita	-0.192**	-0.248***
	(0.092)	(0.085)
GDP per capita growth	-0.004	0.004
	(0.017)	(0.017)
unemployment	-0.008	-0.015
	(0.015)	(0.014)
Individual level control variables		
age	0.023***	0.023***
	(0.006)	(0.006)
age^2	-0.0005***	-0.0005***
	(0.000)	(0.000)

Table 11. Continued.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	CIM	AIM
Individual level control variables		
education (base category: pre-primary)		
primary	0.182	0.191*
	(0.113)	(0.113)
lower secondary	0.036	0.046
	(0.110)	(0.110)
upper secondary	0.069	0.082
	(0.107)	(0.108)
post-secondary	0.080	0.095
	(0.110)	(0.110)
first stage tertiary	0.132	0.151
	(0.108)	(0.108)
second stage tertiary	0.204*	0.231*
	(0.121)	(0.121)
working	1.294***	1.308***
	(0.038)	(0.038)
network	0.835***	0.834***
	(0.023)	(0.023)
opportunity	0.463***	0.463***
	(0.022)	(0.022)
fear of failure	-0.400***	-0.397***
	(0.023)	(0.023)
entrepreneurial confidence	1.400***	1.393***
	(0.028)	(0.028)
Fixed part		
intercept (γ_{00})	-2.197**	-1.543*
	(1.025)	(0.917)
Variance components		
random intercept variance (var(u_{0j}))	0.159***	0.148***
	(0.035)	(0.032)
random slope variance (var(u_{1j}))		0.061***
		(0.020)
Deviance	59,172.625	59,116.501

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 104,050
Countries *K* (level 2 groups) = 45

Appendix I: results of model using GLOBE's cultural practice scores as proxy for culture

Table 14. Regression results of the multilevel logistic model with random intercepts and random slopes for *female* with cross-level interaction terms and different measures for Hofstede's cultural dimensions.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level independent variable						
female	-1.928***	-0.848**	1.004**	0.086	0.473	-0.516
	(0.658)	(0.347)	(0.436)	(0.557)	(0.324)	(1.918)
Country-level independent variables						
power distance GLOBE	-0.051					-0.204
	(0.250)					(0.309)
collectivism GLOBE		-0.164				-0.162
		(0.167)				(0.195)
gender egalitarianism GLOBE			0.185			0.027
			(0.166)			(0.205)
assertiveness GLOBE				-0.051		0.041
				(0.178)		(0.212)
uncertainty avoidance GLOBE					-0.173	-0.259
					(0.129)	(0.177)
Cross-level interaction variables						
female * power distance GLOBE	0.362***					0.252
	(0.125)					(0.217)
female * in-group collectivism GLOBE		0.160**				0.020
		(0.066)				(0.109)
female * gender egalitarianism GLOBE			-0.311**			-0.257*
			(0.129)			(0.145)
female * assertiveness GLOBE				-0.031		-0.007
				(0.134)		(0.144)
female * uncertainty avoidance GLOBE					-0.122	-0.012
					(0.079)	(0.119)
Country-level control variables						
logarithm GDP per capita	-0.105	-0.197*	-0.109*	-0.101*	-0.058	-0.139
	(0.088)	(0.107)	(0.057)	(0.059)	(0.073)	(0.108)
GDP per capita growth	0.003	0.007	0.007	0.006	0.006	0.012
	(0.015)	(0.016)	(0.014)	(0.014)	(0.014)	(0.015)
unemployment	-0.020	-0.017	-0.019	-0.017	-0.028**	-0.021
	(0.014)	(0.015)	(0.013)	(0.013)	(0.014)	(0.015)
Individual level control variables						
age	0.003	0.003	0.003	0.003	0.003	0.003
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
age^2	-0.0002**	-0.0002**	-0.0002**	-0.0002**	-0.0002**	-0.0002**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 14. Continued.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level control variables						
education (base category: pre-primary)						
primary	0.080	0.080	0.084	0.083	0.076	0.083
	(0.145)	(0.145)	(0.145)	(0.145)	(0.145)	(0.145)
lower secondary	-0.035	-0.034	-0.034	-0.035	-0.039	-0.034
	(0.141)	(0.141)	(0.141)	(0.141)	(0.141)	(0.141)
upper secondary	0.019	0.020	0.024	0.023	0.016	0.022
	(0.139)	(0.139)	(0.139)	(0.139)	(0.139)	(0.139)
post-secondary	0.067	0.067	0.070	0.070	0.062	0.069
	(0.142)	(0.142)	(0.142)	(0.142)	(0.142)	(0.142)
first stage tertiary	0.119	0.120	0.123	0.122	0.114	0.121
	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)
second stage tertiary	0.252	0.251	0.258	0.257	0.244	0.255
	(0.157)	(0.157)	(0.157)	(0.157)	(0.157)	(0.157)
working	1.546***	1.545***	1.547***	1.545***	1.544***	1.548***
	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)
network	0.797***	0.796***	0.797***	0.797***	0.796***	0.797***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
opportunity	0.485***	0.484***	0.486***	0.486***	0.485***	0.485***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
fear of failure	-0.380***	-0.380***	-0.379***	-0.379***	-0.380***	-0.380***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
entrepreneurial confidence	1.349***	1.350***	1.350***	1.350***	1.350***	1.349***
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Fixed part						
intercept (γ_{00})	-3.162	-1.726	-4.042***	-3.296***	-3.109***	-0.433
	(1.958)	(1.757)	(0.731)	(0.850)	(0.614)	(3.252)
Variance components						
random intercept variance (var(u_{0j}))	0.130***	0.133***	0.117***	0.123***	0.125***	0.122***
	(0.033)	(0.036)	(0.029)	(0.031)	(0.032)	(0.033)
random slope variance (var(u_{1j}))	0.039**	0.038**	0.050***	0.056***	0.047**	0.034**
	(0.017)	(0.019)	(0.018)	(0.021)	(0.019)	(0.016)
ICC (%)	3.81	3.90	3.43	3.59	3.66	3.57
Model fit statistic						
AIC[a]	40440.37	40449.58	40436.81	40442.83	40444.21	40455.58
Log likelihood (ln L)	-20198.186	-20202.791	-20196.404	-20199.413	-20200.104	-20197.79
Degrees of freedom (k)	22	22	22	22	22	30

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 75,468
Countries *K* (level 2 groups) = 33
[a]AIC is Aikake's information criterion = -2(ln L) + 2k. Where (ln L) is the maximized log-likelihood of the model and k is the degrees of freedom (i.e. the number of parameters estimated in the model). Gradually smaller values over models denote improved model fit.

Table 15. Odds ratios of the multilevel logistic model regression results with random intercepts and random slopes for *female* with cross-level interaction terms and different measures for Hofstede's cultural dimensions.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level independent variable						
female	0.145***	0.428**	2.729**	1.090	1.604	0.597
	(0.096)	(0.148)	(1.190)	(0.607)	(0.519)	(1.144)
Country-level independent variables						
power distance GLOBE	0.950					0.816
	(0.237)					(0.252)
collectivism GLOBE		0.848				0.851
		(0.142)				(0.166)
gender egalitarianism GLOBE			1.203			1.028
			(0.199)			(0.211)
assertiveness GLOBE				0.951		1.042
				(0.170)		(0.221)
uncertainty avoidance GLOBE					0.841	0.772
					(0.109)	(0.136)
Cross-level interaction variables						
female * power distance GLOBE	1.436***					1.286
	(0.179)					(0.279)
female * in-group collectivism GLOBE		1.174**				1.020
		(0.078)				(0.111)
female * gender egalitarianism GLOBE			0.733**			0.773*
			(0.095)			(0.112)
female * assertiveness GLOBE				0.951		1.042
				(0.170)		(0.221)
female * uncertainty avoidance GLOBE					0.885	0.988
					(0.070)	(0.118)
Country-level control variables						
logarithm GDP per capita	0.900	0.822*	0.897*	0.904*	0.944	0.870
	(0.079)	(0.088)	(0.051)	(0.053)	(0.069)	(0.094)
GDP per capita growth	1.003	1.007	1.007	1.006	1.006	1.012
	(0.015)	(0.016)	(0.014)	(0.014)	(0.015)	(0.016)
unemployment	0.980	0.983	0.982	0.983	0.972**	0.979
	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)	(0.014)
Individual level control variables						
age	1.003	1.004	1.003	1.003	1.003	1.003
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
age^2	1.000**	1.000**	1.000**	1.000**	1.000**	1.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 15. Continued.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)
Individual level control variables						
education (base category: pre-primary)						
primary	1.083	1.084	1.087	1.086	1.079	1.086
	(0.157)	(0.157)	(0.157)	(0.157)	(0.156)	(0.157)
lower secondary	0.965	0.966	0.967	0.966	0.962	0.967
	(0.136)	(0.136)	(0.136)	(0.136)	(0.136)	(0.136)
upper secondary	1.019	1.020	1.024	1.023	1.016	1.022
	(0.142)	(0.142)	(0.142)	(0.142)	(0.141)	(0.142)
post-secondary	1.070	1.070	1.072	1.072	1.064	1.072
	(0.152)	(0.152)	(0.152)	(0.152)	(0.151)	(0.152)
first stage tertiary	1.126	1.127	1.131	1.130	1.120	1.129
	(0.157)	(0.157)	(0.158)	(0.158)	(0.156)	(0.158)
second stage tertiary	1.287	1.286	1.294	1.293	1.277	1.290
	(0.203)	(0.202)	(0.204)	(0.203)	(0.201)	(0.203)
working	4.691***	4.689***	4.699***	4.688***	4.682***	4.704***
	(0.224)	(0.224)	(0.224)	(0.224)	(0.223)	(0.225)
network	2.218***	2.217***	2.220***	2.219***	2.217***	2.219***
	(0.063)	(0.062)	(0.063)	(0.063)	(0.062)	(0.063)
opportunity	1.624***	1.622***	1.626***	1.626***	1.625***	1.625***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
fear of failure	0.684***	0.684***	0.685***	0.685***	0.684***	0.684***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
entrepreneurial confidence	3.855***	3.857***	3.856***	3.856***	3.858***	3.853***
	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)
Fixed part						
intercept (γ_{00})	0.042	0.178	0.018***	0.037***	0.045***	0.649
	(0.083)	(0.313)	(0.013)	(0.031)	(0.027)	(2.110)
Variance components						
random intercept variance (var(u_{0j}))	1.139***	1.143***	1.124***	1.130***	1.133***	1.130***
	(0.038)	(0.041)	(0.033)	(0.035)	(0.037)	(0.037)
random slope variance (var(u_{1j}))	1.040**	1.038**	1.051***	1.058***	1.048**	1.035**
	(0.017)	(0.019)	(0.019)	(0.022)	(0.020)	(0.016)

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 75,468
Countries *K* (level 2 groups) = 33
OR > 1 represents a positive relationship, whereas OR < 0 represents a negative relationship.

Appendix J: list of countries in sample when using GLOBE's cultural practice scores

1. Argentina
2. Australia
3. Austria
4. Brazil
5. Canada
6. China
7. Colombia
8. El Salvador
9. Finland
10. France
11. Greece
12. Hungary
13. India
14. Indonesia
15. Iran
16. Ireland
17. Israel
18. Italy
19. Malaysia
20. Mexico
21. Morocco
22. Netherlands
23. Poland
24. Portugal
25. Russia
26. Slovenia
27. South Korea
28. Spain
29. Sweden
30. Switzerland
31. Thailand
32. Turkey
33. United States

Appendix K: results of model without Chile, Spain, and United Kingdom in the sample

Table 16. Regression results of the multilevel logistic model with random intercepts and random slopes for *female* with cross-level interaction terms of sample without Chile, Spain, and United Kingdom

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual level independent variable							
female		-0.118**	-0.415***	0.157*	-0.180	-0.132	0.271
		(0.046)	(0.128)	(0.093)	(0.132)	(0.157)	(0.313)
Country-level independent variables							
power distance			-0.011***				-0.010**
			(0.004)				(0.004)
individualism				0.003			0.000
				(0.004)			(0.004)
masculinity					-0.002		-0.001
					(0.003)		(0.003)
uncertainty avoidance						0.002	0.002
						(0.003)	(0.004)
Cross-level interaction variables							
female * power distance			0.005***				0.000
			(0.002)				(0.003)
female * individualism				-0.006***			-0.007***
				(0.002)			(0.002)
female * masculinity					0.001		0.002
					(0.003)		(0.002)
female * uncertainty avoidance						0.000	-0.002
						(0.002)	(0.002)
Country-level control variables							
logarithm GDP per capita	-0.103*	-0.135**	-0.272***	-0.105	-0.134**	-0.179***	-0.231***
	(0.056)	(0.056)	(0.075)	(0.088)	(0.057)	(0.056)	(0.087)
GDP per capita growth	0.003	0.004	0.000	-0.000	0.006	0.005	0.004
	(0.016)	(0.015)	(0.015)	(0.016)	(0.016)	(0.017)	(0.017)
unemployment	-0.001	-0.005	-0.004	0.002	-0.004	-0.012	-0.004
	(0.015)	(0.015)	(0.015)	(0.016)	(0.015)	(0.016)	(0.016)
Individual level control variables							
age	0.009	0.010	0.010	0.010	0.010	0.010	0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
age^2	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 16. Continued.

D.V. = TEA (= 1 if individual is involved in entrepreneurial activity)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual level control variables							
education (base category: pre-primary)							
primary	0.257*	0.258*	0.256*	0.254*	0.258*	0.254*	0.256*
	(0.135)	(0.135)	(0.135)	(0.135)	(0.135)	(0.135)	(0.135)
lower secondary	-0.027	-0.027	-0.027	-0.030	-0.028	-0.032	-0.028
	(0.130)	(0.130)	(0.130)	(0.130)	(0.130)	(0.130)	(0.130)
upper secondary	0.041	0.042	0.039	0.038	0.041	0.037	0.040
	(0.128)	(0.128)	(0.128)	(0.128)	(0.128)	(0.128)	(0.128)
post-secondary	0.083	0.083	0.083	0.083	0.083	0.080	0.085
	(0.132)	(0.131)	(0.131)	(0.131)	(0.131)	(0.131)	(0.131)
first stage tertiary	0.122	0.124	0.123	0.123	0.124	0.120	0.125
	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)
second stage tertiary	0.272*	0.273*	0.272*	0.271*	0.273*	0.268*	0.277*
	(0.144)	(0.144)	(0.144)	(0.144)	(0.144)	(0.144)	(0.144)
working	1.362***	1.356***	1.354***	1.356***	1.356***	1.354***	1.355***
	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
network	0.837***	0.837***	0.835***	0.836***	0.837***	0.835***	0.835***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
opportunity	0.500***	0.501***	0.498***	0.500***	0.501***	0.500***	0.499***
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
fear of failure	-0.360***	-0.358***	-0.359***	-0.359***	-0.358***	-0.359***	-0.359***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
entrepreneurial confidence	1.334***	1.332***	1.331***	1.330***	1.332***	1.333***	1.330***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Fixed part							
intercept (γ_{00})	-3.557***	-3.185***	-1.236	-3.699***	-3.121***	-2.790***	-1.848*
	(0.556)	(0.566)	(0.882)	(0.776)	(0.584)	(0.627)	(0.977)
Variance components							
random intercept variance (var(u_{0j}))	0.163***	0.152***	0.147***	0.167***	0.154***	0.163***	0.146***
	(0.037)	(0.034)	(0.035)	(0.039)	(0.035)	(0.037)	(0.034)
random slope variance (var(u_{1j}))	0.076***	0.070***	0.048**	0.038***	0.067***	0.067***	0.036**
	(0.024)	(0.022)	(0.019)	(0.015)	(0.022)	(0.020)	(0.015)
ICC (%)	4.72	4.42	4.27	4.82	4.47	4.71	4.26
Model fit statistic							
AIC[a]	43756.5	43745.09	43750.17	43750.98	43756.26	43747.4	43752.4
Log likelihood (ln L)	-21859.252	-21852.546	-21853.084	-21853.489	-21856.13	-21851.7	-21848.198
Degrees of freedom (k)	19	20	20	22	22	22	28

Notes: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Individuals *N* (level 1 observations) = 74,379
Countries *K* (level 2 groups) = 42
[a]AIC is Aikake's information criterion = -2(ln L) + 2k. Where (ln L) is the maximized log-likelihood of the model and k is the degrees of freedom (i.e. the number of parameters estimated in the model). Gradually smaller values over models denote improved model fit.