

# Rethinking innovation in light of women entrepreneurship

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## Abstract

**Framing of the research.** Women empowerment and innovation are deemed an absolute priority in many countries. As a matter of fact, they had been included among the 17 sustainable development goals. Despite the common understanding that progress cannot occur regardless inclusivity, prior literature was being somewhat aloof on this matter. As the result, the research corpus seems mostly established on a sort of patriarchal knowledge, favoring a male-inspired stereotyping of the innovation narrative.

**Purpose of the paper.** This study contributed to extend the conversation on innovation by investigating the phenomenon using the lenses of cultural dynamics and women entrepreneurship.

**Methodology.** Using a large-scale cross-sectional dataset related to the year 2021, drawn from Eurostat and World Bank, hypotheses were tested by means of the Ordinary Least Squares (OLS) linear regression method.

**Results.** Our findings confirmed that innovation is more likely to occur when the country scores high in indulgence and there is a large number of women in business.

**Research limitations.** As a cross-sectional analysis, the study did not capture over-time dynamics.

**Managerial implications.** Inclusivity and well-being accelerate progress and foster innovation.

**Originality of the paper.** The paper challenged the extant narrative of innovation by proposing an alternative gender-based view of the process.

*Key words:* innovation; Hofstede; culture; women entrepreneurship; knowledge; happiness

## 1. Introduction

Over time, Knowledge was carved as a monolithic corpus, unable to reflect nuances driven by subjectivity. However, a reality-grounded perspective suggests investigating subjective characteristics, such as those related to gender.

The focal distortion of extant knowledge is caused by the adoption of a univocal and gender-biased envision of the world. Mostly, gender biases are defined by country culture.

As the result, many research domains lack of an inclusive perspective. Innovation research makes no exception. Consistently, this paper is aimed at investigating what happens to innovation performance when a growing number of women is allowed to enter the entrepreneurial arena.

Previously, entrepreneurship and innovation were mostly studied in connection to male-related characteristics, such as individualism (Kashima *et al.*, 1995).

As a matter of fact, women entrepreneurship and empowerment are still marginal compared to male entrepreneurship (United Nations Development Program's Human Development Report 2021).

Two main resounding gaps emerge from this panorama: 1) a relatively small number of studies on gendered innovation; 2) little awareness of effects of gender biases on knowledge production.

Current work aimed at tackling the retrieved gaps by investigating the relationship among innovation, women entrepreneurship, and cultural dimensions.

Specifically, current research assumed that women entrepreneurship creates a fertile environment for innovation. However, a deep understanding of this phenomenon requires a thorough consideration of countries' cultural background (Hofstede *et al.*, 2005). So, this paper also investigated the impact of two main cultural dimensions: indulgence and masculinity. Indulgence measures the extent of personal freedom and the degree of well-being of a society, whilst masculinity expresses and the dominance of a gender over the other (Hofstede, 1980).

As matter of fact a restrained and masculine societies do not allow women to start up a business.

By and large Subjective Well-being (SWB, popularly known as happiness) can be described as the individual experience of pleasant emotions (Diener, 1984, Kim *et al.*, 2005; Blanchflower and Graham, 2021; Oishi *et al.*, 2013; Burns and Crisp, 2022; Roberts and Helson, 1997; Twenge and Campbell, 2008; Hamamura, 2012). As such, SWB varies over time and space. According to Hofstede *et al.*, (2010), it is possible to measure the happiness of a society in terms of "indulgence versus restraint". Indulgent cultures are focused on individual happiness, well-being, leisure, and freedom, as opposed to restrained cultures (Hofstede *et al.*, 2010). This approach closely recalls the Kantian practical philosophy, which is based on the idea that happiness is freedom of choices: freedom is the ultimate categorical imperative, or the highest moral value of all. A couple of centuries later, scholars rediscovered the value of happiness for economic growth (Khan and Cox, 2017; World Value Survey 2021) in terms of: value co-creation (Hughes and Vafeas, 2021), knowledge-intensive contexts (Salas-Vallina *et al.*, 2018), entrepreneurial initiative (Usai *et al.*, 2020), female entrepreneurship (Ozyirmidokuz *et al.*, 2019), entrepreneurial orientation (Bernoster *et al.*, 2020).

Despite indulgence being relevant for a variety of business matters (Xu *et al.*, 2004; Demangeot and Sankaran, 2012; Cleveland *et al.*, 2013; Zhang, 2017; Kleijnen *et al.*, 2009; Cova and Dalli, 2009; Sorum, 2020; Schneider *et al.*, 2013; Schneider *et al.*, 2016), previous studies overlooked its role in innovation. Antecedent research mostly focused on the impact of individualism on R&D investments (Shao *et al.*, 2013; Choi, 2020; Kim, 2021). Though, indulgence of culture might have a significant influence on individuals' perceptions, cognition, behavior, and creativity (Stein, 1953, Tesluk *et al.*, 1997; Chen *et al.*, 2018; Diener *et al.*, 2003; Gutiérrez *et*

*al.*, 2005; Sirgy, 2021; Schmitt *et al.*, 2007). In addition, that genders show different cognitive and behavioral patterns.

According to the Big Five Inventory scale, women reported higher levels of neuroticism, extraversion, agreeableness, and conscientiousness than did men across most nations (Schmitt *et al.*, 2008). The Big Five Personality Traits Model - conscientiousness, agreeableness, neuroticism, openness to experience, extraversion (Schmitt *et al.*, 2007; Schmitt *et al.*, 2008; Komarraju *et al.*, 2011; Cobb-Clark and Schurer, 2012) -, is based on the assumption that personality impacts emotions (Berkovich and Eyal, 2021), cognition (Yeh *et al.*, 2021), entrepreneurial orientation (Santos, Marques, and Ferreira, 2020), and orientation toward innovation (Kusa *et al.*, 2021).

Based on above considerations, current work explored the relationship among innovation, women entrepreneurship, and two cultural dimensions - indulgence and masculinity.

Data were drawn from a mix of sources: the Eurostat database, the World Bank, and the last available version of the six-dimensions Hofstede's cross-cultural scale. The cross-sectional analysis was focused the year 2021.

After excluding missing cases listwise, the geographical span of the study covered a total of 16 different EU countries (Belgium, Bulgaria, Czechia, Denmark, Estonia, Finland, Croatia, Hungary, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovenia). In total, about 38.000 female owned enterprises were examined.

Relationships among variables were tested by using an Ordinary Least Squares (OLS) regression method.

Results confirmed the positive effect of women entrepreneurship and indulgence on innovation.

For the remainder, the study is structured as follows: section 2 includes the analysis of literature and model's hypotheses, section 3 shows the empirical analysis, along with the discussion, section 4 reports study's concluding remarks.

## 2. Literature background

### 2.1 Knowledge or knowledges?

Albeit we often use the singular noun "knowledge", correctly speaking we should use the plural "knowledges", which reflects subjectivity and variety of cultures.

As a matter of fact, knowledge is created by means of complex and continuous interactions between individuals' and collective's experiences of life (Durkheim, 1909). Individual knowledge is the outcome of cognitive structures, experiences, ideas, concepts, and forms of thoughts (Child, 1940; McCarthy, 2005), whereas social knowledge, named culture, can be described as the formal and substantial expression of societal languages, values, belief, norms, and envisions of the world. The two forms of knowledge influence each other mutually and incessantly (Berger and Luckmann, 1966).

Each society, and, therefore, each culture, has its own specific managerial and communication styles (Morris and Pavett, 1992, Bakhtari, 1995; Lam *et al.*, 2021), along with its own peculiar biases (Hall and Whyte, 1960). As instance, gender biases are more frequent and extreme in high-context cultures - e.g. Asia, Middle East, and Latin America (Women on boards) - than they are in low-context cultures. As a matter of fact, the first type of culture is inherently patriarchal and attributes a high symbolic power to non-verbal communication.

Literature already recognized that the presence of a variety of cultures entails the existence of likewise forms of knowledges. Though, it failed to anticipate the times, by considering that the gender of an entrepreneur may also influence business outcomes, including country innovation.

Understanding the gender nuances of business phenomena is crucial for designing and chartering effective growth roadmaps.

This approach is known as the phenomenological study of knowledge, or the study of phenomena as they occur over time and space.

Accordingly, knowledge can be described as a purposefully implemented strategic construction of reality, or as an organized set of information, acquired by means of experience, exposition, and inference (Zack, 1999): it is a thing - susceptible to be stored - and a process, simultaneously. Consistently, knowledge can occur by acquaintance - “knowledge of things” by direct experience -, or propositionally - a “knowledge about things”, which is acquired indirectly (Zagzebski, 2017).

Other knowledge taxonomies were proposed by scholars over time. Accordingly, knowledge can be classified as: individual, collective, and organizational (Kimmerle *et al.*, 2010; Hecker, 2012; Anderson and Lewis, 2014; Cress and Kimmerle, 2017; Zack, 1999; Nonaka and Takeuchi, 2007); tacit -non-codified, informally articulated and shared, know how - and explicit - codified, formally articulated and systematically shared, know what (Smith, 2001; Dhanaraj *et al.*, 2004; Lei *et al.*, 2021; Gubbins and Dooley, 2021); general and specific (Jensen and Heckling, 1995); declarative - a description of something -, procedural - how something occurs -, and causal - why something occurs (Zack, 1999).

Assuming that knowledge has a phenomenological value, then gender and personality might largely influence knowledge construction (or innovation, for what it matters).

This premise embodies the main rationale to current work.

According to Grant (1996), cognitive function of firms occurs as the recombination and transformation of personal and tacit knowledge into organizational one. In other words, organizational knowledge is formed by means of transforming tacit into explicit knowledge. Tacit knowledge (Polanyi, 1958, 1967) refers to awareness, conceptualizations, and perceptions of a person (Cowan *et al.*, 2000). As such, tacit knowledge is also contextualized, meaning that it is affected by culture and by one’s experience of life (Ancori *et al.*, 2000). Scholars previously suggested that culture affects the individual’s social network size (Batjargal *et al.*, 2019), entrepreneurial intentions (Shinnar, Giacomini, and Janssen, 2012), and personal social resources (Brieger and De Clercq, 2018).

Emotions are likewise relevant for knowledge creation. According to the SECI model (Nonaka *et al.*, 1994), emotions trigger those mechanisms of socialization, externalization, combination, and internalization leading to knowledge creation. They also help to amplify “the knowledge created by individuals and crystallize it as a part of the knowledge system of an organization” (Nonaka *et al.*, 1996; p. 833). Hence, emotions act as knowledge enablers (Von Krogh *et al.*, 2000). Nonaka and Konno (1998) focused on the locus of knowledge creation, or “ba” (Konno and Schillaci, 2021). According to these scholars, knowledge resides, and it is embedded in the “ba”, where the “ba” is a locus of individual acquisition of knowledge through one’s own experience or reflections on the experiences of others (Konno and Schillaci, 2021). If knowledge is separated from its “ba”, it is a mere information (Nonaka and Konno, 1998). At a collective level, the “ba” sublimate into “basha” (Nonaka and Konno 1998, Konno and Schillaci, 2021). Although scholars recognized the importance of emotions for knowledge studies, they limited their analysis to some very specific aspects (Fteimi *et al.*, 2021; Rashid *et al.*, 2021), such as: information technology use (Beaudry and Pinsonneault, 2010), emotional intelligence (Peng, 2013), emotional obstacles (Pemberton *et al.*, 2007), emotional knowledge (Stein and Levine, 2021). Therefore, they failed to use a constructive approach capturing the nexus between positive psychology and knowledge creation.

By and large, knowledge sharing occurs as the socialized response of an individual, elicited by positive emotions (Fredrickson *et al.*, 2003). Positive emotions go under the label of subjective wellbeing (SWB) and they are commonly called “happiness”. Happiness can be described as “a positive inner state, deriving from goal achievement and fulfillment of aspirations” (Delle Fave *et al.*, 2016; p. 30). Happiness is a multifaced construct. We distinguish into: hedonic happiness, life satisfaction, and eudamonic happiness (Kim-Prieto *et al.*, 2005; Kahneman *et al.*, 1999).

The academic interest toward positive psychology was growing in prominence recently (Delle Fave *et al.*, 2016; Ashkanasy, 2011; Waterman, 2008; Oishi *et al.*, 2013; Sirgy, 2021; Pena-López *et al.*, 2021; Uchida *et al.*, 2004; Oishi *et al.*, 2008; Joshanloo, 2014; Lee *et al.*, 2000).

In the field of knowledge management, studies prevalently limited their interest to value co-creation (Cosimato *et al.*, 2021; Hughes and Vafeas, 2021) and to team dynamics (Chung and Huang, 2021), despite a potential relevance of happiness for innovation (Usai *et al.*, 2020; Brulé and Munier, 2021).

At a social level, happiness is captured by a cultural dimension introduced by Hofstede *et al.*, (2010) that was labeled as “indulgence versus restraint”. Specifically, indulgence considers individual acknowledgement of leading a happy time (frequency and percentage) and the extent to which people enjoy freedom. Personal freedom can be deemed as an essential pre-condition for entrepreneurship (Minniti, 2008; Lamine *et al.*, 2021). Nonetheless, many limitations to freedom still impair individual development worldwide. These limitations mostly have a cultural origin. Entrepreneurship is one of the activities that can be prohibited to women (Goel, 2018).

## 2.2 Rethinking innovation in light of women entrepreneurship

The evolution of capitalism (Schumpeter, 1934; Schefold, 1996; Soriano and Huarng, 2013) urged scholars to provide a new envision of the dichotomy between entrepreneurship and innovation (Hodgson, 2001) in light of ethical progress (Ebner, 2006). To date, there is still a dearth of academic contributions on gendered innovation, though.

Women entrepreneurship is deemed to be a potential driver of societal progress (Bullough *et al.*, 2022). Nonetheless, a variety of factors impairs women active contribution to society by means of careers. Culture is one of the main obstacles that women must face (Anambane and Adom, 2018). As a matter of fact, gender biases are entrenched in culture worldwide (Globe 2020). Such biases affect women leadership legitimacy (Newbury, Belkin, and Ansari, 2008), despite their interpersonal skills, empathy (Macaskill *et al.*, 2002), ability of being multitasking (Ruderman *et al.*, 2002), and intercultural attitude (Javidan *et al.*, 2016). As instance, men are usually deemed independent, assertive, natural-born leaders, differently from women (Osborn and Vicars, 1976, Shahriar, 2018; Gupta *et al.*, 2019). Allegedly, gender biases lead to a sort of myopic managerial knowledge, unable to capture the gender-based contribution to innovation. Said literature shortcomings drove both national and supranational institutions to launch an urgent call for gender-fixing knowledge (EU Framework), as a mean for achieving gender parity.

Nonetheless, the majority of extant studies on innovation assumed an ungendered approach (Schumpeter, 1934; Rosenberg, 1982; Hagedoorn, 1996; Trischler *et al.*, 2020; Ughetto *et al.*, 2020; Ojong, Simba, and Dana 2021; Mokline, 2021).

Miller (1983) defined entrepreneurship as “the process by which organizations renew themselves and their markets by pioneering, innovation, and risk taking” (Miller, 1983, p. 770). According to the author, leader’s personality is a factor affecting innovation by means of “locus of control”.

Lumpkin and Dess (1996) emphasized the importance of context for entrepreneurial orientation,

Accordingly, culture and gender-related personality traits might have a slight influence on innovation (Figure 1).

As a matter of fact, innovation always begins with an act of creativity (Okpara, 2007). Kirzner (1999) advised that creativity is associated with entrepreneurial alertness. Alertness is the act of discovery/recognizing an opportunity occurring in reason of cognitive, motivational, and environmental factors (Foss and Klein, 2010). Studies suggested that positive affect - happiness - may be essential for alertness (Levasseur *et al.*, 2020; Fellnhofner, 2021; Tang, Baron, and Yu, 2021). Alert entrepreneurs are optimist (Tang *et al.*, 2021), because positive emotions impact evaluations and judgments of opportunities in terms of increased capabilities of scanning for information, opportunity search, and connection (Levasseur *et al.*, 2020). Alertness also depends on the big five personality traits. As a matter of fact, conscientiousness, openness, and extraversion are positively linked to alertness, whereas agreeableness and neuroticism have

a poor connection with it (Awwad and Al-Aseer, 2021). Alertness is also influenced by culture (Hu *et al.*, 2018) vicariously (Lounsbury *et al.*, 2019). Until these days, the impact of culture on innovation was underemphasized though (Sarasvathy and Dew, 2008).

Yet, a culture is established “by” and it finds expression “through” a series of elements (Lounsbury *et al.*, 2019), as instance as: schemas, scripts, norms and values (Parsons, 1937; Thornton *et al.*, 2012; Giorgi *et al.*, 2015), narratives (Kahl and Grodal, 2016), identity (Navis and Glynn, 2010), practices, objects, and images (Meyer, *et al.*, 2018).

In Western-Calvinistic cultures, innovation is mostly seen as an individualistic process (Steiner 1995; Nakara *et al.*, 2021; Wang and Tan, 2020; Li *et al.*, 2020; Lee and Raschke, 2020; Morris *et al.*, 1993).

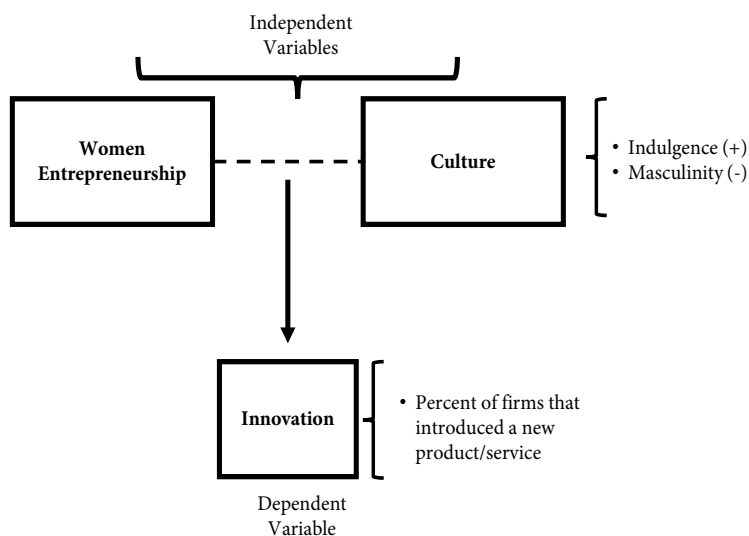
Such pervasiveness of a pragmatic approach to innovation (Montes *et al.*, 2005; Rampersad, 2020; Guth and Ginsberg, 1990) left a little room to understand how emotions influence this process. Yet, innovation is deemed to burgeon when an individual is in a positive mental state of flow (Csikszentmihalyi and Larson, 2014; Lomas *et al.*, 2020) and she/he achieves a sense of attainment (Plagnol and Easterlin, 2008).

Precisely, happiness has four major motivations: “eudaimonic motivation (seeking meaning, authenticity, excellence, and growth), hedonic pleasure motivation (seeking pleasure, enjoyment, and fun), hedonic comfort motivation (seeking comfort, relaxation, ease, and painlessness) and extrinsic motivation (seeking money, power, status, popularity, and image) (LeFebvre and Huta, 2021; p. 2299).

Evidence proved that happiness is positively associated with entrepreneurial orientation (Entrialgo *et al.*, 2000; Fowle, 2019; Bernoster *et al.*, 2020), resilience (Fowle, 2019), self-investment (Shimoni, 2021), and personal freedom (Clark *et al.*, 2008; Inglehart *et al.*, 2008). Emotions are also socially contagious -informed empathy (Miller, 2013).

Typically, empathy is a characteristic frequently associated with women (Arrosa and Gandelman, 2016), as much as extraversion and cooperation (Lu and Argyle, 1991), or “mating bonds, deep friendship, close kinship, and cooperative coalitions” (de Groot *et al.*, 2015; p. 15). Despite occupational differences in the labor market - specifically, in engineering/computer, medical, teaching, and service occupations (Joy, 2006) -, women are also deemed more resilient than man, because of a contrast and habituation effect (Brickman *et al.*, 1978).

Fig. 1: synthesizes the research model and hypotheses



### 3. Research design and empirical analysis

#### 3.1 Sample

Cultural variables were amply used to explain a variety of social phenomena during the last 20 years, at least. Regarding women entrepreneurship, most studies employed the Hofstede's scale (1980). Other scholars have used the Globe extended scale (House *et al.*, 2004), which considers both the six-dimensions Hofstede's scale (2006) and 21 primary dimensions of leadership.

Grounding on antecedent works, data for current analysis were drawn from: Hofstede's cross-cultural rankings, World Bank (Neumeyer *et al.*, 2019; Hechavarría and Brieger, 2020), and Eurostat (Mroczek-Dąbrowska and Gawel, 2020; Gawel and Głodowska, 2021). Extracted data refer to year 2021 and to European Union (EU). The choice of focusing on a single year and only on one economic region was motivated by the need of increasing the accuracy of analysis by avoiding excess missing data.

In addition, EU is a multinational market region, characterized by an acceptable degree of market standardization, which makes this setting rather ideal for studying innovation.

Specifically, EU is characterized by the following factors: economic union, absence of internal tariff and non-tariff barriers, free trade, free people circulation, a single currency, geographic and temporal proximity (time difference is short cross-countries), presence of a scalable and global mass market, price standardization, fair competition, and, to a given extent, some cultural similarity.

Yet, the existence of a central government allows to enforce EU laws throughout the union. These elements fostered standardization. Standardization improves the validity of our analysis as well.



After deciding inclusion criteria, we tabulated and organized data as follows: we excluded all missing values listwise, we classified firms by means of gender of top managers and ownership types, we selected firms by including only those where top managers were female, and we measured the mean values of firm size, to control for firms' dimension.

In total, we examined 16 different countries (Belgium, Bulgaria, Czechia, Denmark, Estonia, Finland, Croatia, Hungary, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovenia) and 38.000 women-owned enterprises.

### 3.2 Methodology

Previous researches used a wealth of methods to test relationships among culture, innovation, and female entrepreneurship and, precisely: Principal Component Analysis - PCA - (Capitanio *et al.*, 2009; Kostis, 2021; Kawai and Kazumi, 2021; Khan *et al.*, 2021), multiple linear regression (Alam *et al.*, 2011; Beriso, 2021; Achim *et al.*, 2021; Pheng and Yuquan, 2002; Lee *et al.*, 2013; Aytekin *et al.*, 2022), moderation analysis (Larbi-Siaw *et al.*, 2022; Panda *et al.*, 2022; Schepers and Wetzels, 2007; Welsh *et al.*, 2014; Santos and Neumeyer, 2022).

Consistently, we performed the Ordinary Least Squares (OLS) multiple linear regression analyses to test our model's hypotheses.

The general linear regression equation is the following:

$$Y_i = \beta_0 + \beta_1 \chi_{i1} + \dots + \beta_n \chi_{in} + e_n$$

### 3.3 Variables

#### 3.3.1 Independent variables

Our assumptions are the followings:

- i. there is a positive relationship between innovation, women entrepreneurship, and indulgence.
- ii. There is a negative relationship between innovation and masculinity.

We considered three different independent variables. The first independent variable is women entrepreneurship (Brush and Cooper, 2012; Ojong *et al.*, 2021). This variable was measured as the percent of firms with female participation in ownership (Matricano, 2022; Audretsch *et al.*, 2022).

Then, we considered two of the Hofstede's (2010) cross-culture dimensions: indulgence versus restraint (ivr), and masculinity versus femininity (mas).

#### 3.3.2 Dependent variable

Innovation is used as our dependent variable. To measure this variable, we considered the "Percent of firms whose new product/service is also new to the main market". This metric choice is corroborated by a plethora of studies (Handfield *et al.*, 1999; Link, 2022; Orlando *et al.*, 2020).

Table 1 shows the descriptive statistics of the analysis.

Tab. 1: Descriptive statistics

	Mean	Standard Deviation
Percent of firms whose new product/service is also new to the main market	79,246875000000000	34,338741331767000
Mas	40,94	21,834
ivr	34,640066964285700	17,675831533336000
Percent of firms with female participation in ownership	96,996875000000000	41,007769462017800

The regression analysis considers how women entrepreneurship, indulgence, and masculinity influence innovation.

Table 2 synthesizes results of the regression.

Tab. 2: Multiple Regression Analysis

Riepilogo del modello <sup>b</sup>										
	R	R-squared	Adjusted R-squared	Standard error of estimation						Durbin-Watson
					Modified R-squared	Modified F	Df1	Df2	Sign. Modified F	
1	,965 <sup>a</sup>	0,931	0,906	10,55	0,931	36,956	4	11	0	2,171
a. Predictors (constant), Percent of firms with female participation in ownership, mas, ivr										
b. Dependent variable: Percent of firms whose new product/service is also new to the main market										

The adjusted R-squared is 0,90 of model 2, which is very good. The Durbin-Watson test value is 2,171, therefore it is deemed acceptable. In particular, VIF values range between 1 and 2, which means there is very poor correlation between variables and that predictors are adequate.

So, the alternative hypothesis is accepted, with a statistically significant p value=, 0 < 0.05 and the null hypothesis should be rejected.

Therefore, the final model is:

- Percent of firms whose new product/service is also new to the main market = -31,8 - 0,3 mas + 0,5 ivr + 0,9 Percent of firms with female participation in ownership

In brief, results show that there is a positive association between innovation and women entrepreneurship. Increasing levels of women entrepreneurship foster innovation. Though, the constant shows that a high number of women entrepreneurs is required to drive a positive effect on innovation. In addition, indulgence is confirmed to be a driver of innovation. By contrast, masculinity seems to hinder innovation.

### 3.5 Discussion

This analysis largely contributes to extend the conversation about innovation, culture, and gender entrepreneurship by bringing to the

surface previously unknown and hidden mechanisms, such as gender biases in knowledge production.

Unprecedentedly, current findings ultimately proved the relevance of women empowerment for the progress of a country.

As a matter of fact, the constant of the regression model - our y-intercept - has a negative value, -31,8, meaning that if we set all of the independent variables in the model to zero, innovation would have been negative. Of course, this scenario is purely ideal and the constant also absorbs all model's biases, in mathematical terms.

Nonetheless, results show that gender parity is a preeminent goal for those countries whose primary aim is achieving a high level of innovation performance.

It must be noted that the proxy of innovation used in our model measures radical innovations, which accounts for a substantial and exportable progress, able to make a differential impact on countries' growth and their reputation/image.

In addition, the evidence also unveiled two further critical culture-related phenomena: 1) masculine-oriented cultures have a slight negative influence on innovation; 2) indulgent cultures seem to create a fostering environment for innovation.

Previous studies provided mixed results about effects of masculinity on innovation (Khan and Cox, 2017): masculinity hinders adoption of innovation (Van Everdingen and Waarts, 2003), but it does not affect levels of country's intellectual capital (Shane, 1993) or creativity (Williams and McGuire, 2010).

Differently, our analysis proved that this cultural dimension might have a hindering effect on innovation. This finding is consistent with our model's assumptions.

As a matter of fact, along with representing an obstacle to women empowerment and opposed to feminine cultures, masculine cultures are based on the followings: assertiveness and egocentrism, gender roles that are clearly differentiated, conflict solved through force, gender wage gap, fewer women in management, traditional family structure *et al.*,

Differently, "Femininity stands for a society in which social gender roles overlap: Both men and women are supposed to be modest, tender, and concerned with the quality of life." (Hofstede, 2001; p. 297). This statement brings us directly to our second and most important result: indulgence is an important driver of innovation. This variable is inherently associated to femininity (Hofstede, 2001). Thus, not surprisingly, this finding is extremely consistent with the idea of women entrepreneurship.

Indulgent cultures have also proved to have a high association with personal freedom, subjective well-being, life satisfaction, and happiness (Li *et al.*, 2022).

Prior research found that indulgent societies are positively associated with innovation adoption likelihood (Syed and Malik, 2014).

Extending previous evidence, our analysis originally revealed that an indulgent culture favors radical innovation generation.

#### 4. Concluding remarks: contribution, impact, limitations, and future research suggestions

Current work extended theory in many directions.

First, our study originally contributed to gendered innovation literature by providing strong evidence that women entrepreneurship is a driver of innovation. For a long time, innovation was investigated by wearing the hat of the white-male entrepreneur. In other words, not only innovation was scantily associated to women entrepreneurship, but it was also biased by the idea that only male-related characteristics were able to drive innovation and progress. This study shed light on the gender bias that affect knowledge production, by unveiling that, on the opposite, innovation is more likely to be positively associated with personal traits that are frequently found in female-groups.

Then, this work contributed to unravel the effects of culture on innovation by tackling a previously unanswered call for large-scale evidence (Büschgens *et al.*, 2013). As a matter of fact, we originally found a negative association between innovation and masculinity.

In addition, current research extended the conversation on subjective-well-being (SWB) by proving the positive influence of happiness on country's radical innovation performance, as opposed to prior evidence (Aldieri *et al.*, 2021). The study has also some crucial implications for managerial decision making and policy makers.

At a managerial level, the study suggested how to escape the coevolutionary lock-in/lock-out trap by investing in gender parity. Typically, innovation is deemed to be a path dependent phenomenon (Thrane *et al.*, 2010; Coomb and Hull, 1998, Freeman, 1990, Goumagias *et al.*, 2022). Hiring women talents might have some relevant implications in terms of increasing levels of creativity and accentuated predisposition toward long-terms results (Van Everdingen and Waarts, 2003; Khan and Cox, 2017).

Consistently, policy makers should focus their efforts toward removing gender biases for the wellness of countries. Women still have poor access to scientific careers or to high-tech intensive resources (Women in Science) and they are exposed to gender pay gap (Chipman and Thomas, 1987, Solomon, 1985, Fox, 1995). Yet, they experience an impaired access to capital (Brush and Cooper, 2012) and to entrepreneurial opportunities (Verheul *et al.*, 2006). Finally, they also have frequent self-esteem and self-confidence issues (Garaika *et al.*, 2019). All the aforementioned problems represent a huge obstacle to women empowerment, and, as such, they endanger the progress of countries.

Lastly, the study has some major social implications in terms of well-being and quality of life. Current evidence confirmed that "happiness" and well-being are drivers of economic growth, by means of innovation. Probably, this result has a multifold explanation: SWB improves creativity, affects consumer behavior by increasing the likelihood of innovation adoption, pushes people to aim for more - i.e.: transcendental needs -, stimulates better and higher levels of education, provides with income slack for making free choices at all levels., etc.

Clearly, structural investments that bring up standards of life can restart country growth.

Among other perks, current robust analysis allows for replicability, thanks to the use of publicly available archival data. However, some limits might bias our results. First, our analysis is cross-sectional. Also, it only considers a limited number of countries/regions. Future research should extend the analysis with longitudinal observations and a larger geographical setting. In addition, we used a linear model, whilst non-linear relationships may still exist. Finally, future studies should also consider additional variables (e.g.: related to subjective well-being or country economy, politics *et al.*).

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## Websites and Data Sources

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