

Article

The Impact of Environmental Risk Exposure on the Determinants of Sustainable Entrepreneurship

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Abstract: Does the increasing awareness of environmental risk exposure also affect intentions to create enterprises which address these social and environmental failures? Besides economic explanations that social and environmental needs and market failure create opportunities for sustainable entrepreneurship, it is less clear how cognitive processes and motivations related to sustainable entrepreneurship are shaped by its context. This research integrates environmental risk exposure as a contextual variable into the theory of planned behavior and uses data gathered in the course of the Global Entrepreneurship Monitor. We provide empirical evidence for the impact of environmental risk exposure on the determinants of sustainable entrepreneurial intention and contribute to a deeper understanding of the formation of sustainable entrepreneurial intention.

Keywords: sustainable entrepreneurship; theory of planned behavior; environmental risk exposure

1. Introduction

Particularly in recent years, it has become more and more obvious that people all over the world increasingly realize the exponentially rising risks of environmental damage caused by humans. According to Hall et al. [1] (p. 440) “awareness is growing that a fundamental transformation in the way society consumes natural resources and produces energy may be needed if we are to make progress on pressing environmental issues such as ecosystem degradation and global climate change.” Recent data show that that human-induced warming and linked damage and environmental risks are gradually speeding up [2,3]. Resulting social movements such as “Fridays for Future” or “Extinction Rebellion” have appeared and have made global impacts by demonstrating for political and economic changes towards climate change mitigation. Besides that, the need to change is also required for economic systems. Especially with the development of sustainable entrepreneurial firms, individuals can mitigate environmental changes and adapt to these, thus contributing to a more sustainable development [4]. However, a precondition for this behavioral change towards sustainability “is to recognize and acknowledge that there is a problem, and that it is severe” [5] (p. 1). But does the exposure to environmental risk increase the awareness of climate change and if so, does this influence the cognitive processes leading to sustainable entrepreneurial intention? This is the main question throughout our study. Particularly in the last two decades, the role of start-ups in propelling not only economic but also promoting sustainable impact has become increasingly popular [4,6–9]. Many terms have been created to describe this type of entrepreneur due to different facets and motivations. However, all terms have as common elements that sustainable entrepreneurs “manage to the “triple bottom line” by balancing economic health, social equity and environmental resilience through their entrepreneurial behavior” [10] (p. 524) and that they are willing to improve the state of the environment, as well as their own and society’s welfare. Thus, this study accounts for the view of

sustainable entrepreneurship in response to the mitigation of and adaptation to environmental and climate changes by the development of sustainable entrepreneurial firms. According to Scott et al. [11] (p. 52), “eco-socio innovation refers to the sustainable-entrepreneurially enacted process of collective idea generation, selection and implementation by people who participate collaboratively to meet ecological and social challenges.” This definition addresses the role entrepreneurs play in utilizing market failures and promoting social welfare through the deployment of economic opportunities [6–8]. The degree to which economic returns are realized might differ significantly between impact- and profit-driven entrepreneurs [12]. Environmental economics view market failures as a source of sustainable entrepreneurial opportunities [7]. This might be a very good explanation for the economic view on sustainable entrepreneurship; however, neither does this view enable us to explain intentions to start up a sustainable business, nor to predict them.

Therefore, to date, it is still unclear how cognitive processes and motivations related to sustainable entrepreneurship are shaped by the context [6]. Yet, this is of research interest as entrepreneurial firms are particularly influenced by the founding entrepreneur’s perceptions and hence are driven by his or her behavioral and cognitive factors [13].

Intentions are determining behavior [14–17] and are the construct of use when it comes to the investigation of individual decision making. Due to Krueger et al. [18] (p. 413) “it seems evident that much of what we consider ‘entrepreneurial’ activity is intentionally planned behavior”. Consequently, a variety of studies have applied the Theory of Planned Behavior (TPB) as an analytical framework to investigate cognitive antecedents related to entrepreneurial intention [19–22]. According to the TPB [15], entrepreneurial intentions are predicted by three attitudinal antecedents. Two of them address the perceived desirability of executing the outcome behavior: the attitude towards the behavior and perceived social norms. The third antecedent refers to the perceived behavioral control of the intended behavior [23]. Kautonen et al. [19] found all three antecedents to explain 59% of the variation in entrepreneurial intention.

Previous studies have already confirmed that the three attitudinal antecedents are also capable of explaining the appearance of sustainable entrepreneurial intention [24–28]. Therefore, building on the TPB and a sample of 175,280 respondents, an intention-based framework is developed to empirically investigate the impact of environmental risk exposure on the formation of sustainable entrepreneurial intention.

With this we propose—next to classical explanatory factors of entrepreneurship intention—the degree of physical hazards by environmental risk exposure as one upcoming explanatory variable, which might become an even stronger determinant in the future. This study is by its nature extending the TPB, as suggested by Ajzen [15]. In addition, using a large dataset guarantees valid results. The paper is structured as follows: In the first step, we provide a theoretical background and derive hypotheses. Next, we present the measures, discuss the data set and describe our research design before we conduct the analysis. The last two sections are devoted to presenting and discussing the results and considering the implications arising from this.

2. Theoretical Background and Hypotheses

Intentions are found to best predict individual behavior [14] including entrepreneurial behavior [19]. Intention can furthermore be defined as the willingness to achieve a given behavior [16]. Thus, analyzing the factors which shape intention also increases an understanding of the behavior in question. Therefore, we apply the TPB in this context to predict sustainable entrepreneurial intention by analyzing the underlying motivational factors. The TPB explains intention along the determinants attitude towards behavior, subjective norm and perceived behavioral control [23]. Attitude towards a certain behavior captures the evaluation of the outcome behavior [16]. A subjective norm relates to the perceived social pressure to execute the behavior [15,16]. Perceived behavioral control comprises the perceived feasibility to accomplish the behavior and is closely related to Bandura’s concept of perceived self-efficacy [23,29,30]. The TPB generally assumes that “the more favorable the attitude and subjective

norm with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual's intention to perform the behavior under consideration" [15] (p. 188). Prior studies have already confirmed the relevance of the TPB in the field of entrepreneurship [19,20,22].

Another model explaining intention is the Shapero and Sokol [31] entrepreneurial event model. According to this model, intention is influenced by three determinants, namely: perceived desirability, perceived feasibility, and the propensity to act [32]. The TPB and the entrepreneurial event model have been found to overlap to a great extent [18,32]. Given the important role social norms play in sustainable entrepreneurship [9], this study focuses on the TPB since it is capturing the influence of social norms.

Thus, drawing on the TPB, an intention-based framework is developed to investigate the impact of environmental risk exposure on the formation of sustainable entrepreneurial intention. Figure 1 shows the conceptual model of the study.

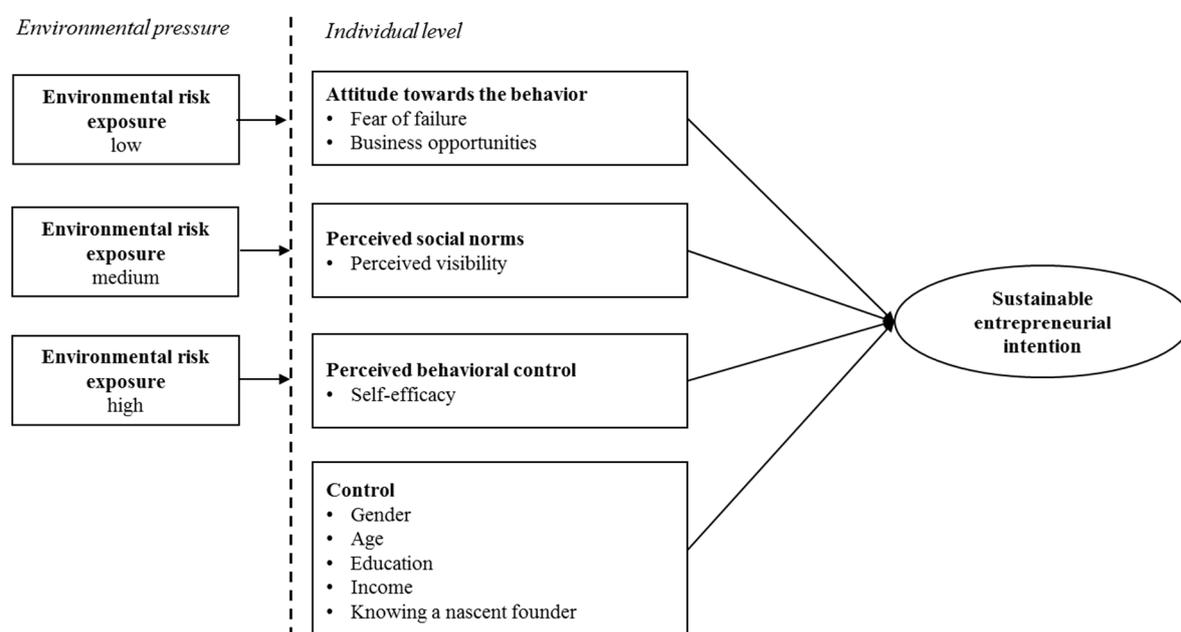


Figure 1. The conceptual model with elements from the Theory of Planned Behavior (TPB) (Ajzen, 1991).

Recent data shows that the environmental risk exposure is not evenly distributed over countries [3]. Generally, in less developed countries the awareness for environmental problems is higher due to a greater likelihood of suffering from environmental risk exposure and no or minor coping capabilities [3]. Previous studies found empirical support by revealing a positive relationship between local environmental problems and the concern of environmental risk exposure in poorer countries [33,34]. Therefore, higher degrees of perceived environmental risk exposure can influence the intention to start up sustainable enterprises.

The personal evaluation or attitude towards sustainable entrepreneurship strongly depends on personal beliefs on whether this might have any impact and success [35]. Two factors determine this evaluation: the fear of failure when starting up such an enterprise as well as the perceived business opportunities to do so.

When founding a new venture, all entrepreneurs are confronted with the fear of financial loss and failure [35,36]. This might be especially valid for emerging markets due to a greater likelihood of environmental risk exposure and few coping capabilities provided by public institutions [3]. Thus, it might be assumed that as the degree of environmental risk exposure increases, the fear of failure might increase in parallel, and this might in turn significantly decrease intentions to start up a sustainable business. We propose:

Hypothesis 1 (H1). *The relationship between fear of failure and the intention to start up a sustainable business is affected by the degree of environmental risk exposure.*

Entrepreneurial opportunities described “as positive and favorable circumstances leading to entrepreneurial action” [37] (p. 310) are essential for entrepreneurial behavior. Previous research has found that sustainable firm behavior is driven by economic opportunities [6]. These opportunities for sustainable entrepreneurship are then pursued by individuals in expectations of entrepreneurial outcomes [10]. But not only monetary benefits might count, sustainable entrepreneurs are especially focused on the solution of major sustainability challenges [4,38]. Thus, two main differences in the development and exploitation of sustainable entrepreneurial opportunities can be identified within current literature. First, sustainable opportunities are found by an individual which identifies a sustainability need and discovers an opportunity to approach it [38]. Second, based on market failures, opportunities are created to address a sustainability need [7,10,38]. Given that opportunities depend on the entrepreneurial environment and alertness [37], it is also assumed for the context of the study that the awareness of such opportunities differs with the degree of environmental risk exposure. Therefore, we propose:

Hypothesis 2 (H2). *The relationship between business opportunities and the intention to start up a sustainable business is affected by the degree of environmental risk exposure.*

The second central construct in the TPB are the perceived social norms. The findings of previous empirical research reported a positive role of perceived norms for entrepreneurial intention in a general context [19,20,22].

Also, for our context, it is assumed that social norms are influential to an individual’s view towards the necessity of sustainable change. An example for such social norms would be separating waste in some countries or eating vegan in some communities. Previous research found evidence for social norms as injunctive norms (that involve the perception of approved behavior) and descriptive norms (that involve the perception of other people’s behavior) resulting in economic actions [9]. Especially descriptive norms are found to be influential to an individual’s behavior since they “send the message “If a lot of people are doing this, it’s probably a wise thing to do,” which serves to initiate norm-congruent behavior” [39] (p. 264). Cialdini [40] for example showed that people intend to recycle if ads communicated a prevalence of recycling. Descriptive norms lay open current social developments like sustainable behavior which can be capitalized by entrepreneurial individuals, resulting in sustainable businesses [9]. As social norms related to sustainable behavior are caused by environmental problems [9], it might be expected that the degree of environmental risk exposure differentially influences the effect of social norms. Therefore:

Hypothesis 3 (H3). *The relationship between perceived social norms and the intention to start up a sustainable business is affected by the degree of environmental risk exposure.*

The third construct of the TPB is perceived behavioral control [15] or respectively perceived self-efficacy, as it is almost congruent with Bandura’s [29,30] construct of self-efficacy [23]. Perceived self-efficacy represents personal judgements of the controllability and perceived ability to perform the behavior [23]. Prior literature produced strong evidence that entrepreneurial self-efficacy is an essential determinant of entrepreneurial intention [41,42]. Furthermore, research has shown that cognitive factors related to entrepreneurship highly depend on contextual factors [43,44]. Thus, we assume that the impact of self-efficacy on sustainable entrepreneurial intention might depend on increasing levels of environmental risk exposure. We propose:

Hypothesis 4 (H4). *The relationship between perceived behavioral control and the intention to start up a sustainable business is affected by the degree of environmental risk exposure.*

3. Methodology

3.1. Data

The “Global Entrepreneurship Monitor Adult Population Survey” (GEM) [45] from 2015 was used to investigate individual level determinants of sustainable entrepreneurial intention in a global setting. We built on an intention-based framework and assumed that environmental pressure influences the intention to become a sustainable entrepreneur. Therefore, we focused on the respondent’s sustainable entrepreneurial intention only and thus restricted the sample to those respondents to reference [45] which indicated whether or not they are currently trying to start a social or environmental activity.

To capture the environmental context of a country, an additional dataset from the WorldRiskIndex [3] was used. Given the aim of the paper to investigate the similarities and differences of cognitive factors with regard to local environmental conditions, we divided countries based on their degree of environmental risk exposure. Thus, countries have been classified by measures indicating high, medium or low levels of environmental risk exposure.

We based our analysis on 175,280 responses as reported by the GEM [45] from individuals based in 57 countries. All country classifications are listed in Appendix A.

3.2. Measures

To capture the dependent variable and independent variables data from GEM, APS [45] was used. This dataset allowed us to identify determinants and various forms of entrepreneurial activity and has frequently been used in previous studies to investigate sustainable entrepreneurship [46–48]. The applied dataset also includes a special topic on sustainable entrepreneurship involving extra questions. Thus, to measure sustainable entrepreneurial intention, we asked respondents the following question: “Are you, alone or with others, currently trying to start or currently leading any kind of activity that has a social, environmental or community objective?”. We selected the response “currently trying to start” as a proxy for sustainable entrepreneurial intention.

To consider the influence of attitudinal variables for the evaluation of sustainable entrepreneurial behavior, we considered fear of failure and the evaluation of business opportunities as valuable determinants. Thus, the GEM APS [45] respondents in each country indicated whether fear of failure would prevent them from starting a business and if they perceived good opportunities for starting a business in the area where they live.

To capture the influence of social norms, the measure of perceived visibility has been included. Perceived visibility comprises the respondent’s perception that the country is shaped by a high visibility of businesses that primarily aim to solve social problems [45].

Furthermore, self-efficacy was taken from GEM [45]. Self-efficacy covers the respondent’s evaluation of whether they have the knowledge, skills and experiences required to start a new business.

In addition, control variables are included. First, we control for gender as women are found to have a more favorable evaluation of sustainability [27,46]. Furthermore, we controlled for gender, as current young social movements like Friday’s for Future might indicate that young people are more concerned about the environment. In this vein, Lepoutre et al. [47] and Vuorio [49] found a positive relationship between young individuals and sustainable entrepreneurship. In contrast, Hörisch et al. [46] and Estrin et al. [50] found that older individuals have higher levels of sustainable orientation. Additionally, we controlled for the level of education, as previous research presents significant results for the role of an individual’s education for sustainable entrepreneurial activity [47,50]. As the contact to other founders and the social network is important for social value creation and social entrepreneurship [12], we additionally controlled for the effect of a social network. Thus, we additionally included gender, age, education, income and social network gained from GEM [45] as control variables. All above variables were transformed into binary coding, indicating a response range with yes = 1 and no = 0.

Environmental risk exposure was captured on a country level. The data provided by WorldRiskIndex [3] allowed us to assess environmental risks on a global scale and gave insights on how

much a certain country is exposed to extreme weather events such as earthquakes, cyclones, floods, droughts and the general sea-level rise which are expected to appear as a result of climate change [2]. Based on the classification of reference [3] (p. 48), we distinguished the countries between the degree of environmental risk exposure indicating low exposure, medium exposure and high exposure. To this end, we created three dummy variables: exposure low for all values classified by reference [3] (p. 48) as very low and low exposure, medium exposure and finally high exposure for all values classified as high or very high.

All measures are presented in Appendix A.

4. Statistical Analysis

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics differentiated by the level of environmental risk exposure. We found the lowest level of sustainable entrepreneurial intention within the countries of low risk exposure (25%) and the highest level of intention within the countries of high-risk exposure (50%). These outcomes might be a first indicator that environmental pressure affects the intention for sustainable entrepreneurship. Correlations of the full sample are presented in Table 2. The correlation matrix does not show correlations higher than 0.254. Furthermore, all variation inflation factors are not greater than 10 and the tolerance is below 0.1, which indicates that multicollinearity is not a problem [51].

Table 1. Descriptive Statistics.

Variable	Low			Medium			High		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Intention	0.025	0.155	76,872	0.027	0.162	34,771	0.050	0.218	52,441
Gender	0.505	0.500	83,377	0.508	0.500	36,989	0.510	0.500	54,909
Age	0.647	0.478	83,381	0.584	0.493	36,989	0.582	0.493	54,910
Education	0.381	0.486	82,293	0.336	0.472	36,531	0.297	0.457	54,394
Income	0.278	0.448	64,996	0.336	0.472	31,346	0.350	0.477	49,957
Social network	0.355	0.479	82,162	0.364	0.481	36,535	0.440	0.496	54,426
Fear of failure	0.431	0.495	79,811	0.377	0.485	35,041	0.390	0.488	53,611
Business opportunities	0.387	0.487	66,881	0.385	0.487	31,839	0.453	0.498	49,349
Visibility	0.282	0.450	61,099	0.353	0.478	22,020	0.379	0.485	43,258
Self-efficacy	0.483	0.500	80,041	0.474	0.499	35,265	0.541	0.498	53,881

Note. N = 175.280.

Table 2. Correlations of the full sample.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	(1) Intention	1									
	(2) Gender	−0.017 ***	1								
Controls	(3) Age	−0.027 ***	0.006 *	1							
	(4) Education	0.041 ***	−0.001	−0.011 ***	1						
	(5) Income	0.026 ***	−0.073 ***	0.018 ***	0.232 ***	1					
	(6) Social network	0.075 ***	0.067 **	0.076 ***	0.060 ***	0.101 ***	1				
	(7) Fear of failure	−0.020 ***	0.071 ***	0.009 ***	0.004	−0.031 * **	−0.029 ***	1			
Independent variables	(8) Business opportunities	0.071 ***	−0.043 ***	−0.060 ***	0.056 ***	0.089 ***	0.228 ***	−0.080 ***	1		
	(9) Visibility	0.025 ***	0.003	−0.007 *	−0.076 ***	−0.033 ***	0.050 ***	0	0.125 ***	1	
	(10) Self-efficacy	0.073 ***	−0.123 ***	0.005 *	0.071 ***	0.100 ***	0.254 ***	0.144 ***	0.212 ***	0.068 ***	1

Note. N = 175.280, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

4.2. Logistic Regression Models

Logistic regression models were used to test the research hypothesis regarding the relationship between the likelihood of the determinants of sustainable entrepreneurial intention and the degree of environmental risk exposure. Therefore, three logistic regression models were created (Table 3).

Table 3. Logistic regression models on sustainable entrepreneurial intention.

Variables/Model	Exposure Low		Exposure Medium		Exposure High		Full Model	
	β	Exp (β)	β	Exp (β)	β	Exp (β)	β	Exp (β)
<i>Controls</i>								
Gender (female = 1)	0.013 (0.065)	1.014	−0.105 (0.094)	0.900	−0.158 *** (0.049)	0.855	−0.076 * (0.035)	0.927
Age	−0.201 ** (0.065)	0.818	−0.380 *** (0.094)	0.684	−0.064 (0.049)	0.938	−0.159 *** (0.035)	0.853
Education	0.564 *** (0.071)	1.759	−0.376 *** (0.113)	0.687	0.345 *** (0.052)	1.412	0.291 *** (0.037)	1.338
Income	0.045 (0.066)	1.046	−0.038 (0.103)	0.963	0.109 * (0.051)	1.115	0.118 ** (0.038)	1.126
Social network	0.475 *** (0.066)	1.608	0.902 *** (0.107)	2.464	0.274 *** (0.050)	1.315	0.455 *** (0.037)	1.576
<i>Independent variables</i>								
Fear of failure	−0.098 (0.066)	0.907	0.170 (0.096)	1.185	−0.118 * (0.051)	0.889	−0.073 * (0.037)	0.929
Business opportunities	0.489 *** (0.066)	1.631	0.657 *** (0.103)	1.929	0.407 *** (0.051)	1.502	0.489 *** (0.037)	1.630
Visibility	0.417 *** (0.066)	1.518	0.187 * (0.094)	1.206	−0.078 (0.050)	0.925	0.155 *** (0.036)	1.168
Self-efficacy	0.531 *** (0.072)	1.700	0.614 *** (0.111)	1.848	0.437 *** (0.055)	1.548	0.497 *** (0.040)	1.643
<i>Model evaluation</i>								
Wald test	12,513.22 ***		5680.59 ***		14,349.08 ***		34,197.42 ***	
<i>Goodness-of-fit test</i>								
Cox and Snell R ²	0.012		0.019		0.011		0.012	
Nagelkerke R ²	0.053		0.080		0.031		0.042	

Note: N = 175.280; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; n.s. $p > 0.05$ (two-tailed-test).

Significant Wald tests ($p < 0.001$) show that all logistic models provide a better fit to the data than the null model [52]. Cox and Snell R² as well as Nagelkerke R² are presented as coefficients for determination for logistic regressions [53].

Our empirical result show that business opportunities and self-efficacy have highly significant ($p < 0.001$) and positive effects on sustainable entrepreneurial intention across all levels of environmental risk exposure. The direction of effects of perceived business opportunities and self-efficacy are unaltered by increasing levels of environmental risk exposure. Consequently, we rejected hypotheses H2 and H4. However, fear of failure has only a negative significant effect ($p < 0.05$) in countries with high environmental risk exposure. Thus, the higher the fear of failure of respondents based in countries with high risk exposure, the less likely ($Exp(B) = 0.889$) that they intend to start a sustainable business. Perceived visibility of social businesses has a positive and highly significant effect ($p < 0.001$) on sustainable entrepreneurial intention in countries with low environmental risk exposure. This effect decreases in countries with medium risk exposure ($p < 0.05$) and turns out to be negative and insignificant in countries with high risk exposure. Therefore, hypotheses H1 and H3 were accepted.

5. Discussion

The aim of this study was to examine if increasing exposure to environmental risk also results in affecting intentions to create enterprises aiming sustainability failures. Our findings show that environmental risk exposure affects cognitive factors in different ways and therefore indirectly influences the decision to start up a sustainable business.

More specifically, we could show that environmental risk exposure significantly increases the fear of failure, which in turn limits sustainable entrepreneurial intention. Less developed countries are facing a greater likelihood of environmental risk exposure and are at the same time dealing with little coping capacities to remove or protect from environmental damage [3]. This might be related to a lack of institutional stability and support, which has generally been found to enhance the fear of entrepreneurial failure [43].

Our analysis furthermore reveals that the intention to start up a sustainable business increases when an individual perceives good opportunities in the area where they live. This finding is in line with previous research [6]. In contrast, Hörisch et al. [46] could not confirm the positive effect of a good business climate on sustainable entrepreneurship. Further research is needed to clarify this contrasting finding. Against our expectations, the relationship is furthermore found not to be affected by the degree of environmental risk exposure. Even though the awareness for a social or environmental need might increase with higher degrees of environmental risk exposure, it does not consequently affect the relationship between perceived opportunities and sustainable entrepreneurial intention. A possible explanation is that the evaluation of opportunities also depends on other factors leading to a favorable evaluation of local conditions like, for example, the institutional environment [54].

Perceived social pressure due to a high visibility of social businesses has the highest effects on sustainable entrepreneurial intention in countries with a low degree of environmental risk exposure. In countries with high levels of environmental risk exposure, the perceived social pressure does not determine sustainable entrepreneurial intention. It might be assumed that individuals based in countries with a high environmental risk exposure do not need to follow norm-congruent behavior established by other people to form the intention to start a sustainable business. They might feel the need to create a sustainable impact on their own due to experiencing firsthand exposure to environmental risks. In countries with low levels of environmental risk exposure, the perceived social pressure exhibited by a high visibility of sustainable businesses is significantly higher. It is assumed that people who are not personally affected by environmental risks are to a higher level influenced by other people's behavior and that this "descriptive norms may help them identify trends upon which they can capitalize" [9] (p. 497).

Our analysis furthermore reveals continuous positive effects of perceived self-efficacy on sustainable entrepreneurial intention which is in line with previous findings of conventional entrepreneurship [19]. However, we found that this relationship is unaffected by environmental risk exposure. In turn, if an individual feels the need to start up a sustainable business but does not perceive high levels of self-efficacy, he or she will not intend to do so.

6. Conclusions and Implication

This study contributes to entrepreneurship literature by using an intention-based framework to examine the influence of environmental risk exposure on the intention to start a sustainable entrepreneurial firm. Therefore, we extended the TPB with the degree of environmental risk exposure as one content-explaining variable.

Our results raise important implications for entrepreneurship theory and practice.

First, we contribute to theory as we have expanded the use of the TPB and enhanced the understanding of the formation of sustainable entrepreneurial intentions. As a result, our study is one of a very small number of studies that explain the intention to start a sustainable business based on drivers other than economic context [9].

Furthermore, our findings show that cognitive determinants of sustainable entrepreneurial intention are affected by environmental risk exposure. Thus, we provide empirical evidence on the importance of environmental factors on entrepreneurial decision making. This responds to recent calls for a deeper understanding on how micro-level cognitive and behavioral entrepreneurial characteristics are shaped by context [6,9].

Finally, our results have practical relevance. First, the findings could help national policy makers to identify institutional support and incentives that best encourage sustainable entrepreneurship. For instance, being aware of major sustainability challenges and market failures enables public policy makers to establish and promote a good business climate and opportunities for sustainable businesses. This is especially recommended for countries like Germany which aim to be pioneers in the field of sustainable technological solutions. Thus, understanding a national context and how this affects intentions to start up a sustainable business is essential for policy makers to develop an international competitive advantage in this field with growing importance. Additionally, this knowledge could also assist in locating sustainable businesses [9]. Taking in mind the influence of descriptive social norms in countries with low exposure to environmental risks, such like Germany, sustainable businesses should be located where a high level of social norms encourages sustainable entrepreneurial behavior, like for example in Berlin.

The exploitation of sustainable entrepreneurial opportunities could be fostered by enhancing the self-efficacy due to entrepreneurial education. In this process, entrepreneurship educators could represent strong role models [55] and thus support the development of sustainable business models [10].

Knowing that fear of failure especially limits sustainable entrepreneurship in countries which are most exposed by environmental risks, international policy makers could offer precise development assistance to foster sustainable entrepreneurship, such as funding, incentives or institutional support, which encourage individuals based in less developed and high exposed countries to take on the risk of starting a sustainable business. This also helps to counter environmentally caused mass migration, which is expected to escalate in the near future.

7. Limitations and Future Research

This study has employed a large-scale survey to provide empirical evidence on the determinants of sustainable entrepreneurship and responds to recent literature calling for large-survey applications [10]. However, our research may have limitations.

First, our variables are limited to the cognitive factors included at GEM [45]. Further research could confirm and extend our results by the use of alternative databases or additional cognitive variables, which were not included in this study. In addition, a qualitative follow-up study could provide deeper insights and explain our findings, such investigating individual differences and explanations for example if the “fear of failure” as included in our database is more shaped by economic or societal loss. Furthermore, the variable of environmental risk exposure was taken from WorldRiskIndex [3] and applied as a proxy for physical hazards due to extreme weather events. We exclusively focused on environmental risk exposure and excluded variables from the social, economic and political sphere. Therefore, we encourage further studies to also include further contextual variables (e.g., coping capacities, vulnerability, institutional environment) to enhance the knowledge of a country’s structural risk exposure, which is not exclusively dependent on the pure environment.

Secondly, we applied the TPB and focused on the determinants of sustainable entrepreneurial intention, thus neglecting the intention-behavior link. However, using theoretical arguments of TPB stating intention as a predictor of behavior [15] and empirical findings in a general entrepreneurial context [19], we became convinced that the intention-behavior link is also valid for predicting sustainable entrepreneurship. In addition, future studies could also clarify to what extent this link is also affected by environmental risk exposure.

Finally, we encourage future studies to test if our results remain stable when using alternative intention-based frameworks, such as the entrepreneurial event model [32] and other types of national environmental pressure, like for example the ecological footprint per person as provided by the Global

Footprint Network [56]. Overall, we are confident that our results are beneficial and suggest the need for further studies contributing to a better understanding of how cognitive factors and motivations related to sustainable entrepreneurship are shaped by context.

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Appendix A

Table A1. Countries included differentiated by environmental risk exposure.

Country	N	Exposure
United States	3000	medium
Egypt	2512	low
South Africa	3130	medium
Greece	2000	high
Netherlands	2258	high
Belgium	2022	low
Spain	24,300	low
Hungary	2000	high
Italy	2000	high
Romania	2002	high
Switzerland	2424	low
United Kingdom	9405	medium
Sweden	5024	low
Norway	2000	low
Poland	2000	low
Germany	3842	low
Peru	2078	high
Mexico	4643	medium
Argentina	3000	low
Brazil	2000	low
Chile	6231	high
Colombia	3686	high
Malaysia	2000	high
Australia	2000	high
Indonesia	5620	high
Philippines	2000	high
Thailand	3000	medium
South Korea	2000	high
Vietnam	2000	high
China	3822	high
India	3413	medium
Iran	3234	low
Canada	3561	low
Morocco	2061	medium
Tunisia	2001	medium
Senegal	2363	high
Burkina Faso	2325	medium
Cameroon	2548	high
Barbados	2000	low

Table A1. Cont.

Country	N	Exposure
Botswana	2200	low
Portugal	2005	low
Luxembourg	2016	low
Ireland	2001	high
Finland	2007	low
Bulgaria	2002	medium
Latvia	2004	low
Estonia	2301	low
Croatia	2000	low
Slovenia	2009	medium
Slovakia	2003	low
Guatemala	2181	high
Panama	2000	high
Ecuador	2120	high
Uruguay	2165	low
Kazakhstan	2106	low
Lebanon	2600	low
Israel	2055	low

Table A2. Measures.

Variable	Operationalization	Data Source
<i>Dependent variable (individual level)</i>		
Sustainable entrepreneurial intention	Are you, alone or with others, currently trying to start or currently leading any kind of activity that has a social, environmental or community objective? (currently trying to start = 1/no = 0)	GEM APS [43]
<i>Independent variables (individual level)</i>		
Fear of failure	Would fear of failure prevent you from starting a business? (yes = 1/no = 0)	GEM APS (2015)
Business opportunities	In the next six months, will there be good opportunities for starting a business in the area where you live? (yes = 1/no = 0)	GEM APS (2015)
Visibility of social businesses	In my country, you will often see businesses that primarily aim to solve social problems (yes = 1/no = 0).	GEM APS (2015)
Self-efficacy	Do you have the knowledge, skill and experience required to start a new business? (yes = 1/no = 0)	GEM APS (2015)
<i>Control variables (individual level)</i>		
Gender	Female = 1/Male = 0	GEM APS (2015)
Age	Age in years (<35 = 0/>35 = 1)	GEM APS (2015)
Education	Postsecondary education (yes = 1/no = 0)	GEM APS (2015)
Income	Belonging to the highest tertial with regard to household income (yes = 1/no = 0)	GEM APS (2015)
Social network	Do you know someone personally who started a business in the past 2 years? (yes = 1/no = 0)	GEM APS (2015)

Table A2. Cont.

Variable	Operationalization	Data Source
<i>Environmental pressure (country level)</i>		
Low environmental risk exposure	Exposure to environmental risk per country low or very low (yes = 1/no = 0)	WorldRiskIndex [2] (p. 48)
Medium environmental risk exposure	Medium exposure to environmental risk per country (yes = 1/no = 0)	WorldRiskIndex [2] (p. 48)
High environmental risk exposure	Exposure to environmental risk per country high or very high (yes = 1/no = 0)	WorldRiskIndex [2] (p. 48)

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