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Determinants of environmental and social sustainability in SMEs

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Abstract

This paper investigates the determinants of environmentally and socially sustainable actions taken by SMEs. The possible determinants that are investigated are firm age, size, growth and location, accessibility of external finance, whether a firm is an exporter and whether it has a sustainability action plan. The actions regarding environmental sustainability are recycling or reusing materials and reducing consumption of or impact on natural resources. The actions regarding social sustainability are improving working conditions of its employees and promoting and improving diversity and equality in the workplace. Data from the Flash Eurobarometer 486 dataset are used to create variables regarding the possible determinants and actions. By executing logit regressions, I found several significant associations between the possible determinants and the four sustainable actions. Results show that environmental sustainability is significantly positively associated with accessibility of external finance and having a sustainability action plan. Furthermore, social sustainability shows a significant positive association with firm size, firm growth, annual turnover, accessibility of external finance, being an exporter and having a sustainability action plan.

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1. Introduction

We live in a world where natural resources are quickly running out and pollution levels are still extremely high. Large businesses largely take blame, where Small and Medium Enterprises (SMEs) are often left out of discussion. When looked at the size of carbon footprints, large businesses are indeed the target for most opportunity of improvement. However, SMEs still account for 64 percent of the pollution in Europe (Sáez-Martínez, Díaz-García & González-Moreno, 2016). This is troubling, since SMEs often lack the resources, skills, or knowledge to adopt sustainable practices (OECD, 2015). This does not imply that SMEs do not take any sustainable actions at all. A recent survey shows that approximately 91% of SMEs in Europe reported to take at least one sustainable action, such as recycling (European Commission, 2020). This paper investigates the determinants of sustainable actions taken by SMEs. The research question is as follows:

"What are the determinants of taking social and environmental sustainability actions by SMEs?"

The eight possible determinants that I investigate are firm size, age and growth, annual turnover, location, accessibility of external finance, whether a firm is an exporter and whether it has a sustainability action plan. The four sustainable actions I analyze are recycling or reusing materials, reducing consumption of or impact on natural resources, improving working conditions of its employees, and promoting and improving diversity and equality in the workplace.

This paper contributes to existing literature by investigating the determinants of sustainable practices by SMEs using new survey data from 2020. Additionally, finding determinants to sustainability could clarify why some companies do and some companies do not take sustainable actions. This could lead to more insight for SMEs, or policy makers. Given that for example, older companies are more sustainable, regulation changes towards younger companies could improve overall sustainability in the market. Besides the possible positive influence on the environment, SMEs themselves could also profit from being sustainable. Vijfvinkel, Bouman and Hessels (2011) find a positive association between environmental sustainability and firm performance. Moreover, Malesios et al. (2018) provide evidence for a positive association between sustainability and firms' financial performance. Therefore, finding determinants of sustainability could lead to higher overall sustainability levels and higher firm performance.

Social sustainability is often overlooked when talking about business sustainability. Instead of moving together, there seems to be a trade-off between social and environmental improvements in a market economy (Omann & Spangenberg, 2002). However, they need to exist together to not set off improvements by one due to decay of the other. Regarding SMEs for example, they need to make

choices due to scarcity of resources, e.g., money for making environmental improvements cannot be spend on social sustainability which could lead to dissatisfaction of employees. Therefore, investigating social sustainability is as important as investigating environmental sustainability. Specifically, if a factor is positively associated with both social and environmental sustainability, there is no trade-off regarding this factor. Improvement with regard to this factor will cause an increase in both social and environmental sustainability, hence no trade-off.

The data I use to answer the research question are derived from the Flash Eurobarometer 486 dataset. The dataset includes interviews with a total of 16,365 SMEs that have at least one employee. I derive independent variables regarding the eight possible determinants from questions in the interview. I execute five logit regressions to find associations between the possible determinants and the sustainable actions. The results show that environmental sustainability is significantly positively associated with accessibility of external finance and having a sustainability action plan. Moreover, social sustainability is significantly positively associated with firm size, firm growth, annual turnover, accessibility of external finance, being an exporter and having a sustainability action plan.

This paper is structured as follows. First, earlier research regarding relationships between the possible determinants and sustainability is discussed. Based on the findings of this research I formulate several hypotheses. Second, the data are introduced, and the method is explained. After this, I discuss the results of the logit regression analysis. In the last section I will elaborate on my findings and provide an answer to the research question. I give some implications of my findings, discuss the limitations, and provide suggestions for further research.

2. Literature review

2.1 Defining sustainability

The definition of sustainability, also called sustainable development, has shifted in meaning over the past years. The first widely accepted definition of sustainability was established by Brundtland and colleagues in 1978. It states that sustainability is "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED, 1987). This definition can be interpreted in different ways, but the original interpretation is welfare equality between generations. This means that at that time, people did not care so much about the economic value of the overuse of resources, but about the preservation of resources for our children (Kuhlman & Farrington, 2010). Nowadays, the term sustainability is still a disputed concept and very context dependent. There is however a more nuanced view on sustainability, to make the concept less dependent on context. It is typically referred to as the three pillars of sustainability: economic, environmental, and social (Purvis, Mao & Robinson, 2019). While this idea is not universal, it has become a mainstream concept in modern literature. In this paper I use the three pillars in a way that there should be no trade-off between them. This means that improving one pillar should not lead to deterioration of another. This could for example happen due to limited resources: money spend towards one pillar that cannot be spend towards the other, which could lead to deterioration. Specifically, I focus on environmental and social sustainability since these pillars are most easily measured and require more research. Environmental sustainability focusses on ecological factors, specifically the preservation of natural resources, corresponding with the 1987 Brundtland definition. Social sustainability on the other hand entails human, labor and cultural rights, health, and basic necessities, for example protection from discrimination (University of Alberta, 2013). Throughout this paper, I will consider environmental and social sustainability independently and equally important, but not as mutually exclusive.

2.2 Environmental sustainability in SMEs

This section provides further information with respect to literature on environmental sustainability in SMEs. An SME is defined as a firm with less than 250 employees. The environmentally sustainable practices I take into account for my analysis specifically are recycling or reusing materials, and reducing consumption of or impact on natural resources. Regarding environmental sustainability in general, there is a lack of research on the business-level. It is often viewed as a macro-economic factor, which can only be measured on the country-level. This seems logical since there is no general measure of environmental sustainability for businesses. Country-level analysis could investigate carbon dioxide emissions and toxic waste etc., but this is more difficult for single firms. This can be concluded from

the literature about sustainability reporting. Sustainability reporting is voluntary and allows for companies to report on their environmental and social performance. Sustainability reporting is not a measure of actual sustainability, but it could be a sign that companies care about taking accountability for their actions and performing well in respect to the environment and society. Literature with respect to sustainability reporting suggest that not all firms apply the same amount and quality of sustainability reporting (Reddy & Gordon, 2010). Besides, there are no accounting standards for sustainability reporting (Eccles, Krzus, Rogers & Serafeim, 2012). It is also possible that firms do not report on their sustainability performance at all since it is voluntary. Therefore, comparison of environmental performance between firms is difficult at the business-level. In this paper, I try to compare sustainability performance of firms by looking at specific sustainable actions and not by looking at for example an overall index. This provides a new view on comparing sustainability performance between firms.

Sustainability on the business-level can also be referred to as corporate sustainability performance (CSP), which includes economic as well as social sustainability. In contrast to environmental sustainability, the concept of CSP is incorporated in the literature about SMEs. Bos-Brouwers (2010) finds that many innovations regarding corporate sustainability made by SMEs are improvements of technological processes. This is due to the high production costs of SMEs that they want to decrease. Eikelenboom and de Jong (2019) show that integrative dynamic capabilities drive all three pillars of sustainability. This is the first time a factor is found that drives the three pillars simultaneously, showing no trade-off between them. They express their concern about the lack of studies about how SMEs can achieve social and environmental performance, when still maintaining a steady economic performance.

2.3 Social sustainability in SMEs

This section provides further information with respect to the literature on social sustainability in SMEs. The socially sustainable practices I take into account are improving working conditions of employees and promoting and improving diversity and equality in the workplace. Social sustainability on the business-level is mostly referred to as corporate social responsibility (CSR), which is a business model that a company can implement to become more socially accountable, especially to shareholders (Investopedia, 2021). Dincer and Dincer (2013) present that CSR activities executed by small business executives are determined by personal feelings and religion, among others. This reflects a more personality-based view on sustainability decisions by SMEs. This might be due to a larger feeling of responsibility for firms with few employees. Pastrana and Sriramesh (2014) show that customers, employees, and shareholders are the most important stakeholders for CSR decisions. Coppa and Sriramesh (2013) on the other hand, find that customers take little part in CSR decisions, but they do

find an important role for employees. Both studies find that employees are important in social sustainability. This is in line with the practices I take into account in the analysis. Namely, improving working conditions and promoting diversity and equality in the workplace are practices that affect employees the most. This suggests that social sustainability practices in SMEs are influenced by personal motives and are directed towards employees.

2.4 Determinants of sustainability

In this paper, the term 'determinant' is used in the context of finding a relationship between two factors. Specifically, a determinant of sustainability is a factor that is related to taking sustainable actions. This means that in some way, this factor determines the level of sustainability. The possible determinants of sustainability I analyze are SME size, age, growth and location, annual turnover, accessibility of external finance, whether the SME is an exporter and whether the SME has a sustainability action plan. I investigate these factors since they could theoretically have an association with the level of sustainability in a firm. Objectivity of the factors also plays an important part, since they are not precisely measured in the data, but orally reported through an interview. Questions with respect to the factors need to be as objective as possible so the respondent can answer correctly. This is necessary to avoid bias and measurement error in my analysis. Questions with answers on a Likert scale (very poor through very good) are relatively subjective and subject to bias and are therefore not taken into account. The following section provides a literature review per possible determinant and a hypothesis that is derived based on earlier findings.

2.4.1 Firm size

SME size is typically measured through the number of employees. Since SMEs have less than 250 employees per definition, the range of firm sizes is smaller when only investigating SMEs in contrast to investigating small versus large firms. This could make it more difficult to find an association between size and sustainability. However, since most SMEs have less than 10 employees, the marginal effect of extra employees could be bigger. Research regarding the relationship between firm size and sustainability contains data of small as well as large firms. Younis and Sundarakani (2020) find a positive relationship between firm size and environmental performance. A similar conclusion is drawn by Balasubramanian, Shukla, Mangla and Chanchaichujit (2020) who find that large firms implement environmental practices to a larger extent than small firms. Both findings suggest that firm size is positively associated with environmental sustainability. The reason for this could be that larger firms generally have a larger carbon footprint, making them more responsible for environmental damage. This could lead bigger firms to take more environmentally sustainable actions to account for taking a larger part in worsening the environment. Social sustainability on the other hand, can be looked at

through the lens of Corporate Social Responsibility. Reverte (2009) shows that companies that have a higher level of CSR are statistically larger than firms with a lower CSR. Moreover, Younis and Sundarakani (2020) also find a positive relationship between firm size and social performance. This positive association could be due to the fact that larger companies generally have more stakeholders (more employees, customers etc.). Therefore, their impact on society is likely to be bigger. This could push a firm to take more socially sustainable actions. Building on this, I expect a positive association between firm size and sustainability in SMEs. The first set of hypotheses is as follows:

Hypothesis 1a: *Firm size is positively associated with engagement in environmental sustainability efforts.*

Hypothesis 1b: *Firm size is positively associated with engagement in social sustainability efforts.*

2.4.2 Firm age

Firm age could be related to sustainable practices through flexibility of firms. Firms that are flexible can quickly respond to changes in the environment. Firms that are older might have deeply rooted business plans that have been implemented a long time. Since sustainability is rapidly evolving, older firms might not adjust as easily and quickly to new sustainable practices as younger firms. However, an association between firm age and sustainability has not been discovered. While Younis and Sundarakani (2020) do find an association between firm size and environmental and social performance, they do not find a relationship between firm age and environmental performance, nor for social performance. Balasubramanian, Shukla, Mangla and Chanchaichujit (2020) show a similar result. They find no significant difference in the extent of implementing environmental practices between younger and older firms. In addition, Dienes, Sassen and Fischer (2016) investigate the drivers of sustainability reporting but find no relationship between firm age and sustainability reporting. The reason for the inconclusive results in existing literature could be that they use a different measure of sustainability which could lead to different results, or they might have used a sample size that is too small. Since I look at specific sustainable actions, the mechanism of firm flexibility (that might apply only to specific actions) should still be considered. The second set of hypotheses is as follows:

Hypothesis 2a: *Firm age is negatively associated with engagement in environmental sustainability efforts.*

Hypothesis 2b: *Firm age is negatively associated with engagement in social sustainability efforts.*

2.4.3 Firm growth

Firm growth, similar to firm size, can be measured by an increase or decrease of employment. Growing companies might be more sustainable for the same reason bigger firms might be more sustainable, as

described in section 2.4.1. Growing companies are likely to experience a growth in their carbon footprint, 'pushing' them to be more sustainable. Furthermore, growing companies are expanding their number of stakeholders, most prominently in hiring new employees, but maybe also in acquiring new suppliers and more costumers. This could lead firms that are growing to take more environmental and social sustainable actions. Research shows no clear relationship between firm growth and sustainable practices. Wang (2017) does show that seven business characteristics, one being firm growth, are positively related to sustainability reporting. Furthermore, Wagner (2010) finds a relationship between economic performance, and environmental and social performance. An economically better performing firm might have more money available, and it may have more resources and knowledge to implement sustainable practices. Economic performance could be related to firm growth directly since firms can only grow when their economic performance is high. This suggests that firm growth could be positively associated with sustainability. The third set of hypotheses therefore is:

Hypothesis 3a: *firm growth is positively associated with engagement in environmental sustainability efforts.*

Hypothesis 3b: *firm growth is positively associated with engagement in social sustainability efforts.*

2.4.4 Turnover

The next factor is annual turnover. Note that turnover is not a measure of success since expenses are not taken into account. It is rather helpful as proxy for firm size or firm growth. I take this factor into account, in addition to firm size that is measured by employment, because it separates smaller SMEs that generate large turnovers from larger SMEs that generate small turnovers. This has more to do with the sector the SME operates in, rather than firm size. Annual turnover might be associated with sustainable practices, since firms with a larger turnover may have more money available. For example, reducing consumption of natural resources causes a need for another source of energy (solar or wind) which requires big investments. Firms with a larger annual turnover are more likely to be able to afford such investments. Several studies investigate the relationship between sustainability and financial performance. Schönborn et al. (2019) find that having a sustainability strategy is a predictor of the financial success of a company. Furthermore, Malesios et al. (2018) find a positive association between sustainability and financial performance. This suggests that more sustainable firms may generate more turnover. However, Steger (2006) points out that the relationship between financial performance and sustainability is a 'chicken-and-egg' question. Are sustainable firms more successful or do successful companies implement sustainable practices more often? Research with respect to turnover specifically

is lacking, but building on the suggested positive relationship between sustainability and financial performance, I formulate the following set of hypotheses:

Hypothesis 4a: *Annual turnover of a firm is positively associated with engagement in environmental sustainability efforts.*

Hypothesis 4b: *Annual turnover of a firm is positively associated with engagement in social sustainability efforts.*

2.4.5 Location

SME location is divided into two categories: SMEs that are located in a large town or city, and SMEs that are not. It has been discussed in existing literature that factors regarding sustainability need to be included in the location strategies of firms. A reason for this is because nowadays sustainability is seen as a competitive necessity (Dou & Sarkis, 2010). Chen, Olhager and Tang (2014) develop a framework for choosing a manufacturing facility location under sustainability. It includes sustainability factors that should be considered when choosing a location. Factors regarding environmental sustainability are for example air pollution, water quality and climate change performance. Large cities generally perform worse in this respect and firms located in large cities might not care as much for environmental factors since they are in an area that already has a bad environmental performance. Another possible reason for why firms in large cities could be less environmentally sustainable, is the larger anonymity in large cities. It is more likely that SMEs are publicly known in small towns where 'everyone knows each other'. There are so many small businesses in large cities that one will not stand out. This gives firms in larger cities more opportunities to perform environmentally worse and not be publicly shamed or called out. This leads to the following hypothesis:

Hypothesis 5a: *Firms that are located in a large town or city are less environmentally sustainable than SMEs that are not.*

On the other hand, social factors that should be considered for manufacturing facility location include education level, local technology, and human rights (Chen, Olhager & Tang, 2014). Since large cities perform better with respect to these social factors, I expect firms that are located in large cities to benefit from this. Furthermore, large cities have more inhabitants with a more diverse set of backgrounds and ethnicities, for example migrants, expats or students coming to large cities. This requires firms to be more open-minded in terms of diversity and equality in the workplace. Therefore, the next hypothesis is as follows:

Hypothesis 5b: *Firms that are located in a large town or city are more socially sustainable than SMEs that are not.*

2.4.6 Finance

One of the biggest issues for SMEs is access to finance. It prevents them from growing and taking a larger part in the economy (Motta, 2020). Access to external finance is important since innovation, specifically with respect to sustainability, requires relatively big investments that SMEs often cannot afford using internal finance. Research shows that there is a positive relationship between formal finance and innovation, which is stronger for SMEs than for larger firms (Wellalage & Fernandez, 2019). This means that firms with less formal finance are less likely to innovate. Since this relationship is stronger for SMEs, access to finance seems more important for the extent to which firms innovate for SMEs than for large firms. It has been proven that innovation and sustainability are linked, with innovation having a significant positive effect on sustainability performance (Kuzma et al., 2020). This suggests that formal finance could have an indirect effect on sustainability performance, through innovation. Ye and Kulathunga (2019) also find a direct positive effect of access to finance on sustainability in SMEs. This leads to the next set of hypotheses:

Hypothesis 6a: Firms that have access to external finance are more environmentally sustainable than firms without access to external finance.

Hypothesis 6b: Firms that have access to external finance are more socially sustainable than firms without access to external finance.

2.4.7 Exporting

The next possible determinant of SME sustainability is whether it is an exporter or not. Pope (2002) investigated the motivations for small businesses to export. He finds four main reasons for why small firms export: it has a unique product, it has a technological advantage over competitors, economies of scale and not missing out on foreign opportunities. This does not mean that there is no relationship between export and sustainability, but it does imply that sustainability is not a prominent factor regarding export decisions. Theyel (2012) also addresses the lack of involvement of sustainability in the decision-making process of firms, which mostly includes economic factors. Furthermore, he finds that firms that produce locally, and collaborate with local customers and suppliers experience social and environmental benefits. In addition, firms that export deal with transportation, which is often bad for the environment in terms of air pollution. Firms often do not take this externality into account while making decisions. This translates into the following hypotheses:

Hypothesis 7a: Firms that are exporters are less environmentally sustainable than firms that are not.

On the contrary, firms that export deal with foreign countries that have different cultures and/or ethnicities. Exporters have foreign customers, suppliers and maybe even employees, hence a more

diverse group of stakeholders. this requires them to be more open in terms of diversity and equality. Therefore, the next hypothesis is:

Hypothesis 7b: *Firms that are exporters are more socially sustainable than firms that are not.*

2.4.8 Sustainability action plan

The last possible determinant of sustainability is whether an SME has a sustainability action plan. I take this factor into account because the results are important for evaluation of business plans. The results of the relationship between having a sustainability action plan and sustainability are important because it will show effectiveness of these plans. I expect that firms that plan to be sustainable are more sustainable. Firms that have a plan take necessary investments into account in budgets which makes it possible to implement sustainable practices. Also, if a firm wants to recycle or reduce impact on natural resources, it requires its employees to be aware of this. Incorporating a sustainability action plan in their business model will create awareness in the company and could increase its level of sustainability. Hence, the last hypotheses are:

Hypothesis 8a: *Firms that have a sustainability action plan are more environmentally sustainable than firms without a plan.*

Hypothesis 8b: *Firms that have a sustainability action plan are more socially sustainable than firms without a plan.*

3. Data

3.1 Dataset

The data I use are derived from the Flash Eurobarometer 486 dataset, which includes interviews with 16,365 SMEs that have at least one employee. The interviews are conducted in 27 European countries and in 12 additional non-European countries. The interviews are telephonic and consist of 26 questions that are about transitioning to more sustainability and digitalization and the barriers and challenges surrounding these topics. All interviews were held between February 19th and May 5th of 2020, mostly before the COVID-19 crisis hit the respective country. In this paper, possible effects of the COVID-19 crisis are not taken further into account. The dataset can be obtained from GESIS. This dataset is suitable to answer my research question since it has a large sample size from many countries that are well represented, contributing to the external validity of my analyses. Moreover, the interviews are commissioned by the European Commission, which contributes to the reliability and accuracy of the data collection since it is a well-known trustworthy source.

3.2 Dependent variables

The dependent variables I use in my analysis are derived from question 24 in the interview, which is as follows: "In terms of environmental and social sustainability, which of the following actions, if any, is your enterprise actively taking?". There are eight answer options containing sustainable practices: (1) recycling or reusing materials, (2) reducing consumption of or impact on natural resources, (3) saving energy or switching to sustainable energy sources, (4) developing sustainable products or services, (5) improving working conditions of its employees, (6) promoting and improving diversity and equality in the workplace, (7) evaluating the impact of your enterprise on society, (8) engaging employees in the governance of the enterprise, and the answer options 'none' and 'don't know'. The respondent was allowed to choose multiple options. Options one to four regard environmental sustainability and options five to eight relate to social sustainability. In this paper my focus lays on option one, two, five and six. For the analysis I transform the four selected actions into dummies, which take the value one if the SME reported to take the action. In addition, I create a new variable that takes the value one if an SME reported to take at least one of the four selected actions.

3.3 Independent variables

In total, there are eight independent variables in the model, which are derived from questions in the interview. The original questions are presented in Appendix A. The first independent variable is firm age. This variable is derived from question one in the interview, in which the year of registration was asked. There are four answer options regarding firm registration: before 2000, between 2000 and

2014, between 2015 and 2018, and after 2019. I use these options unadjusted as the four categories in my analysis. The second independent variable is firm size. This variable is derived from question two, where respondents were asked how many employees the firm has. This question has three answer options, which I also use unadjusted: 1 to 9, 10 to 49, and 50 to 249. Employment growth is the next independent variable. This variable is derived from the question: "Since 2016, how much has your enterprise grown, if at all, in terms of: The number of full-time or full-time equivalent employees". I distinguish whether a firm reported to have an increase in employees or whether it has remained stable or decreased. This results in two categories regarding firm growth: increased and decreased/stable. I neglect the size of growth since the focus lays solely on whether a firm is growing or not, not the size of the growth.

Furthermore, annual turnover is divided into eight categories in the data. I reorganize categories so that there are four categories left. I take the first three answer options as the first three categories: less than 100,000 euros; between 100,000 and 500,000 euros and between 500,000 and one million euros. I merge the answer options one million to two million, two million to five million, five million to ten million, ten million to 50 million and more than 50 million euros into one category that is more than one million euros. I make this decision because I want to reduce the number of dummy variables to keep overview of my analysis, while creating an equal representation of observations amongst categories. Therefore, the categories regarding annual turnover are: less than 100,000 euros; between 100,000 and 500,000 euros; between 500,000 and one million euros; and more than one million euros.

The next independent variable is firm location. There are six answer options to question 8 in the data with regard to firm location. However, I solely focus on one option, which is whether a firm is located in a large town or city. I choose not to focus on the answer options 'in a small town or village', 'in a rural area', 'in an industrial area', 'near a border with an EU-country' and 'near a border with a non-EU country'. Note that since respondents were allowed to choose multiple answer options, a firm located in a large city is not automatically excluded from being located in for example a rural area or near a border. The decision of only investigating whether firms are located in a large city stems from the fact that large cities have the most distinct characteristics relative to the other answer options. Large cities for example have more inhabitants, have a more diverse set of backgrounds and ethnicities, and have more employment opportunities. This cannot be said about a firm near a border or in an industrial area, which are more subjective areas (what is 'near' and what is 'industrial'?). Therefore, the categories regarding firm location are as follows: located in a large town or city or not located in a large town or city.

The last three independent variables are binary variables. First, whether a firm has access to external finance or not. Whether or not they in fact obtained external finance is neglected, as it is most important whether they could if they wanted to. The second binary variable is whether a firm is an exporter or not. Respondents could also indicate to which country it potentially exported to, but I do not take this into account in my analysis. The third and last binary variable is whether or not firms have a sustainability action plan. I merge the answer options 'yes, and it has already been implemented' and 'yes, and it is in the process of being implemented' as having a sustainability action plan.

3.4 Control variables

The control variables I include in my analyses are country dummy variables. Since there are 27 European countries and 12 additional non-European countries, I add 38 dummy variables (one reference country), one per country. By including these dummies, also called country fixed effects, I control for the average differences between countries. This will for example take into account differences in the general sustainability environment of countries. This is important because country specific factors could influence engagement in sustainability efforts between SMEs in different countries. Adding fixed effects prevents country differences to have an effect on the results.

3.5 Statistical methods

To test whether the selected variables are associated with taking sustainable actions I execute logit regressions in the statistical software STATA. I use this statistical method since my dependent variables are binary (taking an action versus not taking an action). The analysis consists of two sections. In section one, the dependent variable is whether a firm takes at least one of the four actions. Dummy variables of the categories of the independent variables described in section 3.3 and the country dummies described in section 3.4 are added. The second section looks at the four actions separately. This results in four models with each of the four actions separately as dependent variable. This will give more insight to the association of the selected variables with a specific sustainable action. This way, a distinction between environmental and social sustainability can also be made. The results are presented as average marginal effects. In the context of a logit regression, marginal effects can be interpreted as the average change in likelihood of the dependent variable due to a one unit change in an independent variable. The effects are computed for each observation in the dataset, after which they are averaged, hence average marginal effects.

4. Results

4.1 Descriptive statistics

Respondents that answered "don't know" to any of the relevant questions in the interview were removed from the dataset. After removing these observations, the dataset still contains 12,606 observations. Table 1 shows the descriptive statistics of the dependent and independent variables. Since all variables are categorial and they can only take the values zero or one, the mean of the variables can be interpreted as the percentage of the total observations to which the category applies to. Looking at the dependent variables, this means that 60.2% of the firms reported to recycle and reuse materials, 50.1% reported to reduce their consumption of or impact on natural resources, 70.2% reported to improve working conditions of its employees and 54.5% reported to promote and improve diversity and equality in the workplace. Furthermore, as much as 86.9% of all firms reported to take at least one of the four sustainable actions. This seems like a high percentage, but this also means that 13.1% of the firms in the dataset does not take any of the four sustainable actions, with an additional chance that still a lot of firms included in the category only take one or two actions. This shows there is still room for improvement.

Looking at the year of registration, we see that only 1% of the firms is registered after 2019 and only 9.7% is registered between 2015 and 2018. The majority of the firms are registered before the year 2000, amounting to 46.6%. We also see that more than half of the firms in the dataset have between one and nine employees, while only 14.8% has more than 50 employees. 21.7% of the firms reported to have experienced a growth in employment since 2016, which implies that 78.3% had a decreased or stable employment level. Regarding turnover, the majority (38.1%) has an annual turnover of more than one million euros while the minority (14.8%) has an annual turnover between 500.000 and one million euros. Furthermore, 48.6% of the firms reported to be located in a large town or city, as much as 73.9% has access to external finance, 32.6% of firms are exporters and 41.4% reported to have a sustainability action plan.

Table 1. *Descriptive statistics of the dependent and independent variables (N = 12,606).*

Variable		Mean	Std. Dev.
Dependent variables			
Recycling or reusing materials (1=yes; 0=no)		0.602	0.489
Reducing consumption of or impact on natural resources (1=yes; 0=no)		0.501	0.500
Improving working conditions of its employees (1=yes; 0=no)		0.702	0.457
Promoting and improving diversity and equality in the workplace (1=yes; 0=no)		0.545	0.498
At least one sustainable action		0.869	0.338
Independent variables			
Year of registration			
	Before 2000	0.466	0.098
	2000 - 2014	0.427	0.297
	2015 - 2018	0.097	0.495
	After 2019	0.010	0.499
Number of employees			
	1 to 9	0.584	0.493
	10 to 49	0.267	0.443
	50 to 249	0.148	0.355
Employment growth (1=yes; 0=no)		0.217	0.412
Annual turnover (€)			
	Less than 100,000	0.185	0.388
	100.000 – 500,000	0.286	0.452
	500,000 – 1 million	0.148	0.356
	More than 1 million	0.381	0.486
Location (1=large city; 0=not)		0.486	0.500
Access to external finance (1=yes; 0=no)		0.739	0.439
Exporter (1=yes; 0=no)		0.326	0.469
Sustainability action plan (1=yes; 0=no)		0.414	0.493

4.2 General sustainability analysis

Table 2 shows the results of a logit regression with the binary variable of whether a firm takes at least one of the four actions as dependent variable. There are several significant results shown in Table 2. The first is registration between the year 2000 and 2014. The probability that a firm takes at least one action decreases by 0.014 (1.4%) if a firm is registered between 2000 and 2014 in comparison to a firm that is registered before the year 2000. This result is significant at the 5% significance level. This is the only category regarding firm age that displays a significant relationship with the dependent variable. Regarding firm size, the probability of a firm taking at least one sustainable action increases by 0.045 (4.5%) if a firm has 10 to 49 employees and increases by 0.041 (4.1%) if a firm has 50 to 249 employees, in comparison to a firm with 1 to 9 employees. Employment growth does not have a significant

association with taking at least one action. In contrast, annual turnover is associated with sustainable practices since all categories regarding turnover are significant at the 1% significance level. The probabilities also increase with higher levels of turnover, implying that there is a positive relationship between turnover and sustainable practices. Furthermore, having access to external finance increases the probability of taking at least one sustainable action significantly by 0.019 (1.9%). I also find that firms that are exporters are significantly more likely to take at least one sustainable action. Lastly, having a sustainability action plan is significantly associated with sustainable practices as well. This variable shows the largest effect, amounting to an increased probability of 0.068 (6.8%) when having an action plan compared to not having such a plan.

Table 2. *Logit regression results, with taking at least one sustainable action as dependent variable.*

Variable	Marginal effect (Standard error)
Registration: 2000-2014	-0.014**
	(0.006)
Registration: 2015 - 2018	-0.005
	(0.010)
Registration: After 2019	-0.026
	(0.026)
Employees: 10 to 49	0.045***
	(0.009)
Employees: 50 to 249	0.041***
	(0.012)
Employment growth	0.011
	(0.010)
Turnover (€): 100,000 – 500,000	0.029***
	(0.008)
Turnover (€): 500,000 – 1 million	0.036***
	(0.010)
Turnover (€): More than 1 million	0.036***
	(0.010)
Large town location	0.004
	(0.006)
Access to external finance	0.019***
	(0.006)
Exporter	0.020***
	(0.007)
Sustainability action plan	0.068***
	(0.006)
Country dummies	Yes
Observations	12,606
Log pseudolikelihood	-4172.599
Pseudo R^2	0.149

Notes: Reference categories are 'before 2000' (registration), '1 to 9' (employees) and 'less than 100,000' (turnover). Robust standard errors between parentheses. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$.

4.3 Environmental and social sustainability analysis

In this section I will be looking more closely into the individual sustainability actions and their determinants. Table 3 shows the logit regression results for four different models, each one with a different sustainable action as dependent variable. Looking at year of registration we see that registration between 2000 and 2014 is negatively associated with recycling and reusing materials and reducing consumption of natural resources, compared to firms registered before 2000. Furthermore, registration between 2015 and 2018 is also negatively associated with reducing consumption of natural

resources. Firm registration and social sustainability do not seem to be associated with each other, only showing one marginally significant result ($p < 0.10$) which is a positive association between registration between 2015 and 2018 and promoting diversity and equality in the workplace.

Firm size, as measured by the number of employees, shows highly significant results for its association with social sustainability. The results in column (3) show that having 10 to 49 employees increases the probability with 0.068 (6.8%) of a firm improving working conditions of its employees, compared to a firm with 1 to 9 employees. Having 50 to 249 employees increases this probability with 0.086 (8.6%). This shows a positive association between firm size and social sustainability. In contrast, firm size and environmental sustainability show less clear results. Merely having 50 to 249 employees is significantly and positively associated with reducing consumption of natural resources.

Employment growth has a significant relationship with social sustainability. A growing firm is 0.023 (2.3%) more likely to improve working conditions of its employees than a non-growing firm. The probability of a firm promoting and improving diversity and equality in the workplace increases by 0.042 (4.2%) if it is growing in employees. This shows that firm growth is positively associated with social sustainability. Employment growth and environmental sustainability are not significantly associated with each other.

If we look at the variables related to annual turnover, we firstly see that turnover is highly significantly associated with recycling and reusing materials. The results suggest that there is a positive relationship between turnover and recycling and reusing materials. Furthermore, the category of an annual turnover above one million is positively associated with reducing consumption of natural resources. There is a clear positive relationship between turnover and the social sustainability actions in column (3) and (4), showing that the probability increases as turnover increases.

Firm location only shows significant results for promoting and improving diversity and equality in the workplace, but the increase in probability is quite low (0.016) and significant on a 10% significance level only. In contrast, having access to external finance is positively associated with all sustainable actions. Therefore, access to external finance is positively associated with both environmental and social sustainability. Moreover, the variable of whether a firm is an exporter shows significant results for one of the two environmentally sustainable actions. Specifically, being an exporter increases the probability of reducing consumption of natural resources by 0.016 (1.6%). There is no convincing evidence that being an exporter and environmental sustainability are associated since only one action shows a significant result, which is significant on the 10% level only. The results do show that being an exporter is significantly and positively associated with both social sustainability actions. Lastly, having a sustainability action plan is positively associated with all four sustainability actions. Remarkable is

the high increase in probability for all four actions when having an action plan compared to not having an action plan, the highest being an increase in probability of 0.165 (16.5%) for reducing consumption of or impact on natural resources.

Table 3. *Logit regression results, taking specific sustainable actions as dependent variables.*

Y	Environmental sustainability		Social sustainability	
	(1) Recycling or reusing materials Marginal effect (Standard error)	(2) Reducing consumption of natural resources Marginal effect (Standard error)	(3) Improving working conditions of its employees Marginal effect (Standard error)	(4) Promoting and improving diversity and equality Marginal effect (Standard error)
Registration: 2000-2014	-0.025*** (0.009)	-0.036*** (0.009)	-0.002 (0.008)	0.010 (0.009)
Registration: 2015-2018	-0.015 (0.015)	-0.037** (0.015)	0.021 (0.014)	0.028* (0.014)
Registration: After 2019	-0.023 (0.040)	0.004 (0.042)	-0.020 (0.036)	0.032 (0.039)
Employees: 10 to 49	-0.001 (0.012)	-0.001 (0.012)	0.068*** (0.012)	0.058*** (0.012)
Employees: 50 to 249	0.021 (0.016)	0.039** (0.016)	0.086*** (0.015)	0.075*** (0.015)
Employment growth	0.017 (0.012)	0.020 (0.013)	0.023* (0.013)	0.042*** (0.012)
Turnover (€): 100,000 – 500,000	0.047*** (0.012)	0.010 (0.013)	0.053*** (0.011)	0.022* (0.012)
Turnover (€): 500,000 – 1 million	0.045*** (0.015)	-0.002 (0.015)	0.069*** (0.013)	0.028* (0.015)
Turnover (€): More than 1 million	0.053*** (0.014)	0.026* (0.014)	0.084*** (0.013)	0.049*** (0.014)
Location	-0.010 (0.008)	-0.013 (0.008)	0.008 (0.008)	0.016* (0.008)
Access to external finance	0.039*** (0.009)	0.026*** (0.010)	0.038*** (0.009)	0.038*** (0.009)
Exporter	0.014 (0.009)	0.016* (0.009)	0.027*** (0.009)	0.020** (0.009)
Sustainability action plan	0.104*** (0.008)	0.165*** (0.008)	0.082*** (0.008)	0.117*** (0.008)
Country dummies	Yes	Yes	Yes	Yes
Observations	12,606	12,606	12,606	12,606
Log pseudolikelihood	-7184.867	-7505.448	-6565.306	-7098.609
Pseudo R^2	0.152	0.141	0.145	0.183

Notes: Reference categories are 'before 2000' (registration), '1 to 9' (employees) and 'less than 100,000' (turnover). Robust standard errors between parentheses. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$.

5. Discussion and Conclusion

In this paper, the following research question is investigated: *"What are the determinants of taking social and environmental sustainability actions by SMEs?"*. The results show several significant results for the association between the selected independent variables and sustainable actions. First, no clear association is found between firm size and environmental sustainability. Therefore, I do not accept hypothesis 1a. This goes against the findings of Younis and Sundarakani (2020) and Balasubramanian, Shukla, Mangla and Chanchaichujit (2020). The reason for this could be that the sample size is too small for a significant association to be picked up. In other light, the two specific actions that I focused on in this paper may not be an accurate representation of general environmental sustainability level of a firm. In contrast, a significant positive relationship between firm size and the social sustainability actions is found. This is in line with hypothesis 1b. It is also in line with research from Reverte (2009) and Younis and Sundarakani (2020). The explanation that larger firms are more socially sustainable through a larger group of stakeholders could play a role.

Firm age shows no significant association with environmental nor social sustainability. Therefore, hypotheses 2a and 2b are not accepted. However, some significant associations were found between some categories and actions, but not enough to conclude an overall positive or negative relationship. Existing literature also suggested that there is no relationship with firm age and sustainability (Balasubramanian, Shukla, Mangla and Chanchaichujit, 2020; Younis and Sundarakani, 2020). This might suggest that firm age and the general sustainability level of a firm are not associated. However, firm age and specific sustainable actions, such as reducing consumption of natural resources, might be associated, since it shows promising results for a negative relationship. Therefore, firm age might only influence specific aspects of sustainability.

Furthermore, firm growth shows a positive association with the socially sustainable actions, but not with the environmentally sustainable actions. Hence, hypothesis 3a is not accepted and hypothesis 3b is accepted. Reasons why I could not find a relationship between firm growth and environmental sustainability could be due to the fact that the relationship simply does not exist, or that the sample size is too small to find significant results. Since existing literature shows no relationship between firm growth and environmental sustainability as well, it might be the case that this relationship is non-existent.

The same conclusion can be drawn for annual turnover. Social sustainability shows a positive association with annual turnover, while there is no decisive evidence that environmental sustainability and turnover are associated. I therefore do not accept hypothesis 4a and accept hypothesis 4b. Even though I did not find a clear association between turnover and environmental sustainability, the results

did show promising results for a positive association between turnover and recycling and reusing materials. A reason for this might be that specific sustainable actions require larger investments than other actions. Therefore, the mechanism of having more money available for large investments is bigger for some actions, showing a significant result for only those actions for which the mechanism is more prominent.

Regarding firm location, there is no clear overall significant association between being located in a large city and social and environmental sustainability. Hypotheses 5a and 5b are thus not accepted. There is however one significant relationship, that is between being located in a large city and promoting and improving diversity and equality in the workplace. This might suggest that firm location and social sustainability are indeed positively associated, as was hypothesized. A larger sample size could possibly improve upon the significance of the results and provide a decisive conclusion.

Contrary to firm location, accessibility of external finance has a significant positive association with both social and environmental sustainability. For this reason, hypothesis 6a and 6b are accepted. This is in line with findings from Wellalage & Fernandez (2019) and Ye and Kulathunga (2019). The positive relationship might suggest that accessibility of external finance is necessary for SMEs to acquire capital for large investments, in order to innovate with respect to sustainability.

Moreover, whether a firm is an exporter is positively associated with social sustainability. However, there is no clear evidence that exporting and environmental sustainability are associated. Therefore, I do not accept hypothesis 7a and accept hypothesis 7b. I did not find a negative relationship between exporting and environmental sustainability; On the contrary, the results might suggest a positive relationship. Namely, exporting is positively associated with reducing consumption of natural resources. Again, a larger sample size could ensure more significant results.

Lastly, firms with a sustainability action plan are significantly more likely to take environmental and social sustainability actions. Hence, I accept hypothesis 8a and hypothesis 8b. These findings show that sustainability action plans might be effective for actual sustainability performance. Specifically, the results for having a sustainability action plan are the largest, implying that having a sustainability action plan is the most important determinant for both environmental and social sustainability.

Taking all these findings into account, my research questions could be answered as follows. The determinants (defined as factors that are associated with sustainability) of environmental sustainability that I found in this paper are accessibility of external finance and having a sustainability action plan. The determinants of social sustainability found in this paper are firm size, firm growth, annual turnover, accessibility of external finance, being an exporter and having a sustainability action plan. These findings are of importance for helping those SMEs that are least likely to be sustainable.

Especially the factors that can be adjusted, which are access to external finance and having a sustainability action plan are most important for implications. If governments want to raise SME sustainability levels, they might need to think about making external finance available to more SMEs. They could also try to promote implementing a sustainability action plan, since a positive relationship between having a sustainability plan and sustainability performance suggests that sustainability plans are effective, and this effect could be quite large looking at the results in this paper. Since accessibility of external finance and a sustainability action plan are related to both environmental sustainability and social sustainability, there is no trade-off between the two pillars of sustainability if a firm were to improve upon these two factors.

5.1 Validity

The external validity of this study is high, considering I used a large (N=12,606) representative dataset of 27 European countries and an additional 12 non-European countries. Additionally, each country is well represented in the dataset, with approximately 200 to 400 SMEs per country. Therefore, the dataset mirrors the population well. The findings can likely be generalized to other countries. However, since all countries in the dataset are relatively developed countries, it is unsure whether the findings are also applicable to developing countries. Contrarily, the internal validity is low. Only eight independent variables are taken into account in the regression, and only one set of control variables is included. Overall, the explanatory power of the models is limited. Several variables are not included in the models that also affect sustainability. For example, firm profit and ownership are not considered while both factors could possibly affect the sustainability performance of a firm and should therefore be taken into account. Hence, there is the possibility of omitted variable bias and the results cannot be interpreted as causal effects. Moreover, there is a chance of reverse causality, which means that we do not know the direction in which the relationship is going. This refers to the chicken-and-egg question mentioned before. For example: are growing firms more socially sustainable, or are socially sustainable firms more likely to grow, or maybe both? This is another reason for why I cannot speak of causality. However, the models do show interesting relationships.

Another concern regarding internal validity is the endogeneity in the relationship between having a sustainability action plan and taking sustainable actions. Having a sustainability action plan might be equal to taking sustainable actions, evidently, depending on the specific action plan of the firm. Therefore, simultaneity could play a part in the finding that the positive association between having a sustainability action plan and environmental and social sustainability is relatively high.

5.2 Limitations

This research mostly suffers from limitations regarding the regression analysis, building on the low internal validity. This means that there are most likely omitted variables that should have been taken into account. A reason for this is that I limited myself to the questions in the dataset regarding the creation of independent variables and control variables. In addition, all variables were divided into categories instead of being continuous. This is a limitation since the categories are quite big in range. Take for example the number of employees between 50 and 249, there is a big difference between a firm that has 50 employees and a firm that has 249 employees. This research does not differentiate between the two. Adding to this limitation, I did not take answer options of some questions in the interview as is, but instead merged several answer options. This limits the analysis to only those newly created categories. This is not problematic per se, but it limits my research in comparison to having continuous variables (or more categories). Furthermore, non-linear relationships are not investigated. It could be the case that the relationship between an independent variable and sustainability is for example U-shaped. Lastly, even though my sample size is quite large, a larger sample size would be able to make the results more reliable and maybe provide more significant results.

5.3 Further research

Further research could try to improve upon the limitations of this research. This could be done by expanding the set of independent variables and control variables, increasing the internal validity. Specifically, variables like the general sustainability environment in a country, other firm characteristics like ownership and control variables like the sector the firm operates in could be interesting to add to the analysis. Non-linear relationships or interactions between variables could also be investigated, by using polynomials and interaction terms in the regression. More research could also be done towards the other four sustainable actions that are left out in this paper. That is, also investigating saving energy or switching to sustainable energy sources, developing sustainable products or services, evaluating the impact of the enterprise on society, and engaging employees in the governance of the enterprise. In addition, since the dataset only includes developed countries, it would be interesting to include developing countries as well or to investigate those countries in a separate study.

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Appendix A

Q1   In what year was your enterprise first registered? If you are not sure, please provide your best estimate.

- o   2019 and after.
- o   Between 2015 and 2018.
- o   Between 2000 and 2014.
- o   Before 2000.
- o   Don't know.

Q2T   How many employees, excluding the owners, does your enterprise have?

- o   1 to 9 employees.
- o   10 to 49 employees.
- o   50 to 249 employees.
- o   250 employees or more.
- o   Don't know.

Q4T   What was the annual turnover of your enterprise in 2019?

- o   100,000 euros or less.
- o   More than 100,000 and up to 500,000 euros.
- o   More than 500,000 and up to 1 million euros.
- o   More than 1 million and up to 2 million euros.
- o   More than 2 million and up to 5 million euros.
- o   More than 5 million and up to 10 million euros.
- o   More than 10 million and up to 50 million euros.
- o   More than 50 million euros.
- o   Don't know.

Q5.1   Since 2016, how much has your enterprise grown, if at all, in terms of: The number of full-time or full-time equivalent employees

- o   It has decreased.
- o   It has remained stable.
- o   It has grown by less than 30.
- o   It has grown by at least 30.
- o   Don't know.

Q8   In which of the following areas is your enterprise located? (MULTIPLE ANSWERS POSSIBLE)

- o   In a large town or city.
- o   In a small town or village.
- o   In a rural area.
- o   In an industrial area.
- o   Near a border with an EU country.
- o   Near a border with a non-EU country.
- o   Don't know.

Q10 Would your enterprise be able to obtain external financing in case of need?

- o Yes, definitely.
- o Yes, probably.
- o No, probably not.
- o No, definitely not.
- o Not applicable (SPONTANEOUS).
- o Don't know.

Q11 To which international markets, if any, did your enterprise export goods or services in 2019? (MULTIPLE ANSWERS POSSIBLE)

- o None, your enterprise only operates in (OUR COUNTRY).
- o Other EU countries.
- o Other European countries outside of the EU (incl. Russia).
- o North America.
- o Latin America and the Caribbean.
- o China.
- o Rest of Asia and the Pacific.
- o Middle East and Africa.
- o Don't know.

Q24 In terms of environmental and social sustainability, which of the following actions, if any, is your enterprise actively taking? (MULTIPLE ANSWERS POSSIBLE)

- o Recycling or reusing materials.
- o Reducing consumption of or impact on natural resources (e.g., saving water or switching to sustainable resources).
- o Saving energy or switching to sustainable energy sources.
- o Developing sustainable products or services.
- o Improving working conditions of its employees.
- o Promoting and improving diversity and equality in the workplace.
- o Evaluating the impact of your enterprise on society.
- o Engaging employees in the governance of the enterprise.
- o None (SPONTANEOUS).
- o Don't know.

Q25 Do you have a strategy or action plan to become a sustainable enterprise, i.e. combine long-term success and profitability with a positive impact on society and the environment?

- o Yes, and it has already been implemented.
- o Yes, and it is in the process of being implemented.
- o No, but it may be considered in the future.
- o No, and it will not in the future.
- o Not applicable (SPONTANEOUS).
- o Don't know.