



Sustainability Practices and Performance in European Small-and-Medium Enterprises: Insights from Multiple Case Studies

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Abstract

The advancement of sustainability trajectories is a critical challenge for most of small- and medium-sized enterprises (SMEs). SMEs require specific considerations with regard to business methodologies for achieving and enhancing sustainability, since their business case is far from similar to larger counterparts. As a consequence, tools for implementation of sustainability practices within SMEs need to recognize these differences as well and take into account the intrinsic characteristics and special needs of these enterprises accordingly. This paper reports findings from a multiple case study survey aiming to explore new directions for enhancing the sustainability levels demonstrated by European SMEs. Case studies were conducted in SMEs from four European countries (Denmark, Austria, Greece, and the UK) attempting to shed light on the implementation status of sustainability practices within their business core design and suggest ways of transferring such approaches to other SMEs. In this context, three key questions guided the study — What is the current status of sustainability practices by European SMEs?, what are the emerging issues, setbacks and opportunities towards sustainability practices in SMEs?, and what strategies, resources, and competences may facilitate effective sustainability embeddedness in SMEs? Face-to-face interviews were conducted with owners and managers of the selected SMEs to better understand their attitude and performance in terms of implementing sustainability practices. Findings allow highlighting key sustainability practices as well as drivers and barriers that stimulate or hamper respectively the sustainability practices implementation. While findings reveal a considerable variation in viewpoints among the interviewed SMEs, we identify a strong orientation and momentum towards sustainability endorsement. The paper concludes with implications for policy and management planning and an overarching aim to increase awareness and consideration of sustainability aspects in European SMEs.

Keywords European small-and-medium-sized enterprises · Sustainability practices · Sustainability performance · Drivers · Barriers · Multiple case study research

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Introduction

Small- and medium-sized enterprises (SMEs) are acknowledged as the driving force of the global economy. SMEs represent a noteworthy part of the economies in both developed and developing nations [1]. According to the EU definition, an SME is an enterprise with fewer than 250 employees and a turnover of less than €50 million [2, 3]. According to the OECD, SMEs contribute up to 60% of total EU's GDP [4]. The number of SMEs in the EU-28 increased by 13.8% between 2008 and 2017, thus significantly contributing to the recovery and subsequent expansion of the EU economy [5]. In specific settings, the impact of SMEs' has led to considerable loss of environmental quality, since these organizations have not, generally, included sustainability practices in their procedures, techniques, or long-term vision. Collectively, SMEs have been identified as a major problem area in the field of environmental regulation [4], lagging behind in comparison to larger companies [6]. These facts indicate clearly that sustainability management in SMEs leaves much to be desired.

SMEs need to begin receiving all the more sustainable practices to guarantee a better future for the ages to come. Sustainability could be achieved through the right combination of economic, environmental, and social factors [7]. Over the last years, an impressive consideration has been centered around the point of manageability, coordinating and finding a balance between ecological, financial, and social parts of an organization. Despite the high number of SMEs in all business sectors, sustainability practices, and performance of SMEs have scarcely been examined so far, especially when compared to large enterprises [6, 8].

In the present paper, a case study examination on the sustainability management and corresponding performance of European SMEs investigates certain approaches and views of the managers/owners of selected SMEs with regard to various sectors of industry and services. Subsequently, collected information in order to provide insights on the level and types of sustainability approaches within European SMEs is presented. For the purpose of this paper, four countries have been chosen: Denmark, Austria, Greece, and the UK. These countries have been chosen to reflect diverse economic and geographical environments for the operation of SMEs. The UK has been identified as sharing a strong economic industrial performance while British governments actively support the implementation of sustainability measures in SMEs [9]. Danish SMEs are in general perceived as being environmentally/socially responsible and strongly engaged with environmental and social initiatives [10]. Greek SMEs' sustainability performance remains one of the weakest in the EU despite the efforts for improvement in the recent years. SMEs play an important role in the Greek economy, providing almost 6 out of 10 jobs, which is remarkable compared with the EU average of 3 out of 10 jobs [5]. Due to the financial crisis of the past decade, investigating Greek SMEs will provide valuable information regarding the effects of events such as the economic crisis on sustainability. SME productivity in Austria is well above the EU average, and Austrian SMEs are reported to be well ahead of all other EU Member States in the area of environmental and sustainability management; however, further sustainability oriented measures are expected in the future [5]. The selection of case studies from different geographical and business environments ensures diversity (see, e.g., [11]). Our selection is diverse, as we are including SMEs from northern (Denmark, UK), central (Austria), and southeastern Europe (Greece).

An in-depth examination of real case studies regarding the sustainable plans of action of SMEs comes up short in comparison to large companies, since just a few articles have concentrated on SMEs until now (e.g., [12–14]). Additionally, the current research is expected to offer advancement to the issue of sustainability performance of SMEs in Europe, examining this topic from a drivers/barriers perspective, which up to now remains

under searched. The contributions of the paper are expected to benefit both stakeholders and managers of SMEs, by understanding from a practical perspective how sustainable management practices are implemented in SMEs, how these practices help in achieving better performance, and by proposing additional alternatives.

Interviews were conducted with 12 selected European SMEs from the UK, Austria, Denmark, and Greece, in an effort to identify the viewpoint of their plans of action towards achieving and enhancing their sustainability levels.

The key research objectives of this paper are:

- RO1: Assessing the current status of sustainability management in SMEs in the selected European countries and examining underlying drivers and barriers that stimulate the implementation of sustainability practices.
- RO2: Shedding light on the issues, challenges, and opportunities on adopting sustainability practices from a managerial perspective in European SMEs, allowing us to identify similarities and differences due to geographical allocation within Europe.
- RO3: Proposing relevant key strategies for an effective implementation of sustainability practices which can further facilitate sustainability growth in European SMEs.

The research describes the results of qualitative research on selected SMEs in Europe, aiming at highlighting informative points on the attitudes and perceptions of SME managers and owners located in four countries towards sustainability practices and performance. Another target of this research is to identify the most important drivers for the implementation of sustainability practices in SMEs of these countries, as well as barriers that hamper their implementation. Prior research has indicated that the external drivers are significant for enhancing sustainability in SMEs [15]. External drivers may arise from stakeholders, such as governments, customers, suppliers, and competitors.¹ Among the external drivers, legislation has been indicated as a major driving force for sustainability practices implementation (see, e.g., [17]). Others attribute adoption of sustainability practices to imposing fines and penalties due to non-compliance with environmental regulations [18]. Internal drivers focus mainly on the employees of SMEs and the organizational culture in the company, including the personal commitment of owners/managers of SMEs among other internal factors (see, e.g., [19–21]).

The general framework of our approach and followed analysis is described visually in the following figure (Fig. 1).

The paper contributes to the discussion of adopting sustainability measures within an SME framework, receiving the point of view of SMEs on the difficulties they are facing towards becoming more sustainable and proposing certain plans of action for future implementation of sustainability strategies.

The rest of the paper is structured as follows. The “[Literature Review](#)” section provides the literature review on the topic, the “[Materials and Methods](#)” section demonstrates the methodological steps. The main results as derived from the interviews are summarized and presented in order to describe the sustainable business model of the SMEs, the challenges they face and innovations developed towards improving their sustainability level within a European context (“[Results — Case Study Analysis](#)”). The “[Discussion](#)” section summarizes the main findings of the paper and proposes avenues for further research on the topic. “[Conclusions](#)” provides the main conclusions of the study.

¹ For a comprehensive review on drivers of sustainability practices for SMEs, see [16].

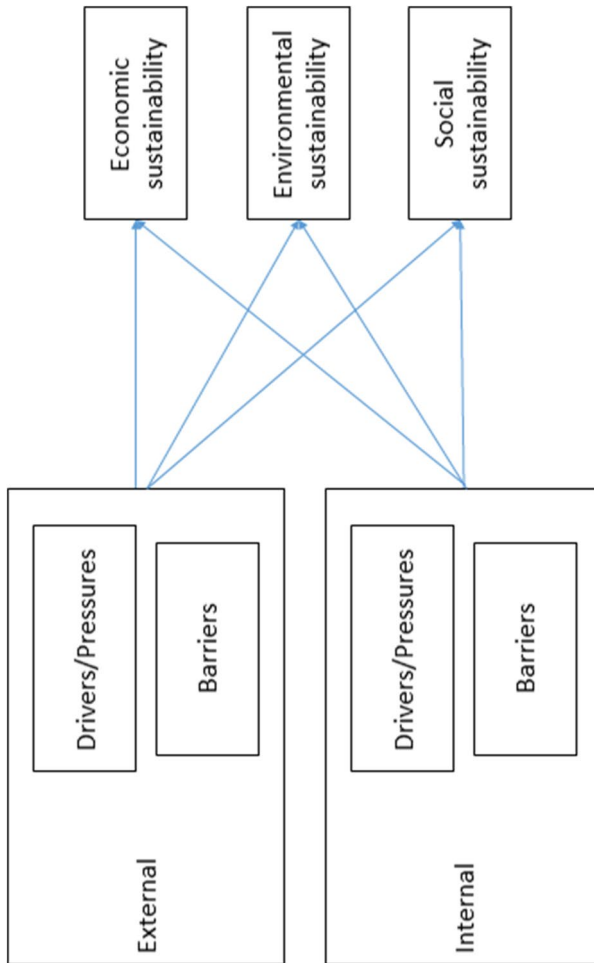


Fig. 1 Research framework for the association between external and internal drivers/barriers with sustainability of SMEs

Literature Review

For the purposes of the current study, an extensive review on the relevant literature associated with research on SMEs and specifically on the most frequently utilized sustainability practices and performances in this type of enterprises has been conducted.

Regarding the environmental practices, effective waste management by reducing waste, reusing, and recycling of resources, e.g., materials, water [22–28] has been mainly emphasized. In addition, actions related to the reduction in energy/fuel consumption to reduce greenhouse gas emissions and pollutants [24, 29, 30] are frequently utilized by SMEs. It has been also reported in the relevant literature that resource and energy efficiency could be adequately achieved through the replacement of older equipment [31–33]. Installation of suitable filters can also assist in controlling emissions [34]. Elimination of toxic substances in production processes [35] or promotion of products that require minimal amounts of hazardous materials [32] also provides an opportunity for adopting green manufacturing, as suggested in the literature.

Green purchasing is another important way for enhancing green supply chain management. For this purpose, suppliers that provide eco-friendly materials and services should be preferred (see, e.g., [36]). Other environmentally friendly activities are associated with eco-design practices, such as designing products that ensure their environmental consequences of the product's entire life cycle are known before its production and distribution [37]. The literature also highlights the use of reverse logistics. For example, movement of products from the consumption point to the company's manufacturing sites in order to recycle, reuse, repair or remanufacture is also very popular [24, 38].

The environmental collaboration with the suppliers is also an important factor for being more sustainable, e.g., through formal and informal collaboration between an SME and suppliers with the objective of mitigating environmental problems [23, 39, 40].

Other suggestions from prior research are certain initiatives that go beyond the standard environmental legislations and requirements, for example, certifications (e.g. ISO 14001, EMAS) [23, 39, 41]. EMAS refers to the European Union's Eco-management and Audit Scheme [42].

Environmental actions that inform policymakers, the public, and customers on SMEs' environmental performance, e.g., by publicizing their achievements or their environmental sustainability reports on their websites or on relevant sustainability reporting platforms, have been suggested by Battaglia et al. [43]. McKeiver and Gadenne [44] suggest providing specific staff that is responsible for the company's environmental management activities.

The social aspects of sustainability practices are usually covered by initiatives such as the implementation and standardization of health and safety policies and practices in the SME [43, 45, 46], the provision for the well-being and proper working conditions of the employees, including good labor relations [47], ethical behavior [30, 48], flexible working hours policies [49], workforce diversity, provision for employee benefits [50], the building of long term relationships with the customers [51], and providing training to employees [52]. Donations and charities to the community [39, 49, 53] or sponsoring students [49] have also been proposed by relevant research. Acquiring health and safety certifications (e.g., OHSAS 18001) is also critical for the enhancement of social sustainability levels in SMEs [54–56].

Finally, economic performance on behalf of SMEs is frequently measured through either well-established measures such as the growth in profit [57, 58], market share [59, 60], turnover and return on investment (ROE) [34, 61], or through more subjective measures, such as measurements based on the company's image to customers [62].

Materials and Methods

This study adopts a multiple case study-cross analysis approach [63]. “Case study method is used when there is need to understand a real-life phenomenon in depth, but such understanding encompassed important contextual conditions—because they were highly pertinent to your phenomenon of study” [64]. The type of the research varies from the single case study to multiple case study. The choice of type of case study is dependent on the aim of the research. In the current paper, we have chosen to conduct a multiple comparative case study. Multiple comparative case study aims at producing generalized results by comparing different cases, in the effort to understand complex organization problems. Miles and Huberman [65] state that multiple cases provide “... an even deeper understanding of processes and outcomes of cases, the chance to test (not just develop) hypotheses, and a good picture of locally grounded causality.” In the following sub-sections, a detailed description of the research method followed in the present paper is provided.

Methodology and Analysis

From a theoretical viewpoint, the current study uses resource-based view (RBV) framework in order to determine the strategic resources an SME can exploit to achieve sustainable competitive advantage [66]. In principle, the RBV is a strategic managerial framework used to determine the internal resources that an organization can exploit to achieve enhanced sustainability performance.

Numerous scholars have focused on the sustainability potential of SMEs [11, 19, 67, 68]. However, this study cross compares the SMEs located in varied regions in Europe in order to bring out the commonalities and differences in their sustainability practices. The presence and performance of SMEs across the EU countries vary significantly. Although a vast number of policy measures being adopted and implemented in European SMEs, there is still need for improvement with regard to sustainability levels in SMEs, for example, not all EU Member States have established an organization specifically dedicated to offering support to SMEs in complying with environmental and energy regulations, as required [5].

The multiple case study by cross analysis helps in generalizing the theories. The deductive approach of the case study facilitates confirming or rejecting the appropriateness of theories [63]. Based on the nature of the case study, three different types can be distinguished: (a) explanatory causal case study, (b) descriptive case study, and (c) exploratory case study. In this research, the exploratory multiple case study approach has been followed, using multiple cases to draw a single set of cross case conclusions. Case study method has been followed with focus on generalizing the observations of the research.

In particular, the case study approach investigates the theoretical framework, strategies, and practices of sustainability of the SMEs. The SMEs considered in the study belong to the group of SMEs that have some understanding and have implemented some aspects of the sustainability practices. The specific SMEs have been proposed and visited by project partners in each of the four countries. The best practices, challenges, and strategic preferences to sustainability are studied by interviewing the top management of the SMEs. The data was collected by interview using a semi-structured interview protocol to find answers to the research questions. Interviewers' positions in the selected SMEs are either the owner of the company or a top manager. The length of the interviews generally ranged between 1.5 and 2.5 h. Interviews were conducted in the premises of each SME. All the interviews with SMEs were recorded and transcribed. Finally, we must

note that reliability of research was established through the development of a case study protocol described analytically in the following sub-section.

Data

Our sample composes of diverse geographical and business environments. In particular, the following case study protocol has been followed; SMEs participating in this study were identified and selected by academic partners located in each of the four countries. Interviews were conducted at the premises of each SME with the owner or the responsible manager of the company (Interviews were conducted between February-June, 2019). Visit at the premises of the companies assisted in observing routine business practice. A total number of 12 face-to-face interviews were collected through this procedure. The number of interviews provide the academic rigor [63]. To assist the collection of relevant information, a structured questionnaire has been sent to the participants in advance. This semi-structured interview method provided a deep understanding of the problems and motivations for implementation of sustainability practices within the SMEs.

The structured questionnaire included questions related to sustainability practices and the corresponding performance of the SMEs, attempting to measure the sustainability performance of the company according to the views of the owner/manager by providing ratings using a suitable Likert scale. Questions are separated to three distinct groups, relating to the three main pillars of sustainability, i.e., environmental, social, and economic variables.

Interviewees were chosen among the company's top management related to strategic planning of sustainability management, such as the owner, manager of the company, or the person responsible for sustainability issues in the company. For each case study, one person among the potential candidates mentioned above was selected for conducting the interview.

Results — Case Study Analysis

General Information/Description of the Selected SMEs

Selecting an appropriate number of companies for the multiple case study analysis is important to ensure the quality of the research and validity of outcomes [69].

Table 1 provides information on the selected companies. For competitive reasons, anonymity of the selected SMEs is preserved.

Appendix contains the qualitative evaluation results in terms of the SMEs' individual sustainability practices and performances (Table 2). In the following sub-sections, an analytical presentation of the current status of SME sustainability management efforts, at the country level and broken down by the three pillars of sustainability (i.e., economic, social and environmental aspects), is presented.

Current State of Sustainability Management in the Selected SMEs

Economic Practices

Denmark Danish SMEs constantly seek for funding, which they receive primarily from national funds, even though EU funding is regularly applied for as well. Our study revealed that national funding is at a high level, e.g., through the InnoBooster program (RO2). This

Table 1 Main characteristics of the selected SMEs

Case studies	Country	Year of establishment	Main activities	Sector
SME 1	Greece	2002	Wine company	Processing, Trading
SME 2	Greece	1994	Dairy products industry	Processing
SME 3	Greece	1974	Production and trade of sugar	Manufacturing
SME 4	Austria	1958	Production of mineralized wood chips boards	Manufacturing
SME 5	Austria	1939	Production of components for handling equipment	Manufacturing, Trading
SME 6	Austria	1950	Production of folding cartons	Manufacturing, Trading
SME 7	Denmark	1956	Production of plastic parts	Manufacturing
SME 8	Denmark	1992	Production of probiotics	Medical and pharmaceutical
SME 9	Denmark	2013	Baggage handling and ground handling products for airports	Logistics and transportation
SME 10	UK	1984	Printing company	Service
SME 11	UK	1923	Timber products manufacturer	Manufacturing
SME 12	UK	1970	Metal pressings and metal stampings manufacturer	Manufacturing

Danish Innovation Fund invests in development projects that are targeted at small- and medium-sized companies with up to 250 employees as well entrepreneurs and scientists with a CVR number. It is noteworthy that all investigated SMEs reported that they have applied for and received at least one InnoBooster fund.

In order to reduce costs, many SMEs share premises, which frequently results in further business cooperation and thus, even stronger cost reductions. Additionally, certain tasks and business functions (e.g., accounting) are performed by one single office for all in-house companies and are run on a standardized system. The companies regard this approach to be economically sustainable. This type of cooperation is also applied in the sales services. This approach can be followed more widely by European SMEs in order to effectively implement sustainability practices (RO3).

In terms of supply, Danish SMEs in general intend to source locally. If local sourcing costs are reasonable, the SMEs try to collaborate with local suppliers. Otherwise, distant suppliers are considered.

Austria In Austria, numerous funding opportunities exist that target especially at SMEs (RO2). Various actions that have been introduced since 2008 started delivering results by providing funding to Austrian SMEs. Currently, regular funding opportunities at the national level are from the Public Employment Service Austria (AMS) (<https://www.ams.at/organisation/public-employment-service-austria>). AMS usually provides partial funding for hiring personnel. Other sources for national funding are Austrian venture capital funds, such as the aws Founders Fund (<http://www.gruenderfonds.at/en/>). In addition, programs at the federal state level exist, e.g., the KWF Carinthian Economic Promotion Fund (<http://www.kwf.at/>). However, SMEs that have already received funding stress the need for simpler procedures and report issues with the bureaucracy associated with the application and completion of the programs. A major issue is that a large number of reports are required at frequent stages of the funding program. Especially in case of SMEs, this can

be a challenge due to lack of specialized personnel to perform these tasks. This issue is a frequently reported barrier on behalf of SMEs in our case study investigation (RO1).

Most SMEs put emphasis on collaboration with local suppliers. However, in many cases, they are forced to seek other sources for materials since local supply is expensive. All interviewed managers reported that in general local suppliers are preferred. Yet, in many cases, this is difficult because of the unavailability of certain materials or because of higher costs. A particular SME manager stated that "...more and more nowadays we are relying on suppliers from China due to the cost reduction potential" (SME5, owner, manufacturing/trade).

Greece Funding for SMEs in Greece is a priority as was revealed by our case study analysis, although there are specific problems and challenges that constitute the acquiring of funding and successful completion of financed projects problematic, mainly due to issues related to bureaucratic bottlenecks and administrative burden faced by SMEs in applying these projects (RO1).

Spending's of SMEs on local suppliers is quite low, with two out of three SMEs stating that the specific spending's being lower than 10% of total expenditures. It appears that especially for Greek SMEs, this barrier constitutes a major issue and problem, since they are struggling to find local suppliers and most of the time resort to suppliers further distant apart (RO1).

Economic crisis taken place in the last 10 years in the country has large negative impacts in the financial performance of interviewed SMEs; however, during the last years, there have been positive indications of stabilization in their financial results and even increases in turnover and profits of SMEs. The owner of a Greek SME engaged in the wine sector has reported that "one of the major challenges the company faces is the administrative burden of an excise duty on wine, faced by all SMEs in this sector" (SME1, owner, processing/trade).

The UK The UK has shown significant progress in recent years regarding funding opportunities for small businesses. One reason for this might be due to the merge of government-owned British Business Bank and the Start Up Loans Company, which now assists microbusinesses accessing finance [5]. In addition, the Midlands Engine Investment Fund (MEIF), supported by the European Regional Development Fund (ERDF), is especially targeted to SMEs in the Midlands region, by providing various funding options.

Collaboration with local suppliers is practiced by all British SMEs interviewed, with some stating a proportion of spending's on local suppliers reaching over 50% of the total spending's of the company. As a more general finding, we may say that British SMEs focus much on the long term relationships with their suppliers.

Social Practices

Denmark In Denmark, there are strict health and safety regulations that SMEs need to follow. The culture in the country also pushes the SMEs to be above the standards regarding health and safety practices. The clients often demand high health and safety standards, and following this demand, it substantially improves their image to the customers. Frequent audits and visits by governmental authorities as well as from customers are also assist in the implementation of a correct occupational health and safety management system. Customers in Denmark require high standards in health and safety regulations in SMEs. The above constitute effective strategies for a successful implementation of sustainability practices in Denmark (RO3).

Large emphasis is also put in promoting the company within the local community. As examples, SMEs are reporting that to engage on this, they often run activities to promote their company in the local community (e.g., by visiting schools and providing donations). Hiring from the local community is also a goal for most of the companies, as another opportunity on adopting social sustainability practices (RO2).

Austria Interviewed SMEs in Austria try to keep good relations with their employees, e.g., through organization of summer camps or other activities for their personnel (RO2). Also of importance is the finding that it is quite common practice for SMEs in Austria to allow personnel to be able to work from home. Another trend in attaining good relations between employers and employees is the utilization of specialized website platforms where employees are able to rate their employers, e.g., the kununu website (<https://www.kununu.com/>).

Regular or periodical meetings with managers/owners of the SEMs and the employees are also a practice followed by all Austrian SMEs included in the research, a finding that was also present in Danish SMEs.

Regarding certifications acquired by SMEs in Austria, besides the standard certifications as ISO 9001, ISO 14001, there is also the ethics quality certification. More specialized certifications, such as the PFSC (<https://www.pefc.co.uk/>) which specializes in promoting good practices in the forest supply chain or the BRC certification (<https://www.foodchainid.com/certification/brc-food-safety-certification/>) which is a food market oriented recognized certification, are also popular in the country. Certifications promoting sustainability is widely pursued by many SMEs in our study and can be further utilized in European SMEs (RO1 and RO2).

Greece Among the basic aims of the Greek National Strategy for Health and Safety at Work (2010–2013) was the promotion of health and safety issues in the workplace in small and medium enterprises (RO3). Greek SMEs tend to focus more on occupational safety than on health promotion. The main reasons for this are lack of economic resources along with insufficient information on health promotion. The latter characteristic has been also verified by the current research.

Although most of Greek SMEs are aware of and receive certifications such as ISO 9001, the general sense on behalf of the managerial staff in these companies is that their customers are not interested in certifications. It is due to this, that one SME manager stated that “our company does not plan to renew their ISO 9001 certification in the future” (SME2, owner, processing).

The UK All three British SMEs have at least acquired an ISO 9001 certification. One of the companies additionally reported obtaining the IFC and FSC certifications. The FSC certification is for companies associated with wood or fiber-based products and guarantees their customers that the FSC-labelled product they buy has come from a forest and supply chain that is managed responsibly. Surprisingly, all interviewed British SMEs have ranked at a low to medium their performance on the occupational health and safety management system.

Environmental Practices

Denmark Environmental part of sustainability is of most importance for Danish SMEs, since all managers have stated that they have made progress and want to further improve on this part of sustainability (RO1). Energy consumption and its adequate monitoring is at a

high level in Danish SMEs, according to the results of our study (RO1). In all cases, there exists at least one person in the company that has been assigned to monitor and keep track of the energy consumption levels. A standard way for energy reduction is through replacement of standard lighting with efficient LEDs and control systems. All SMEs are reporting that this has achieved a significant reduction in energy consumption.

There is also focus in trying to switch to electricity vehicles. This has been reported by the SME engaged in the manufacturing of plastic/technical parts for technical packaging and can be further pursued and backed up by external funding and or alternative incentives (RO3).

Reuse and repair are more and more implemented into their strategic plans. One SME (engaged in aviation industry and particular in baggage handling and ground handling products for airports) reported that "...we regularly repair various parts of our production, such as carts, components since the industry that provides these parts is expensive" (SME9, manager, logistics/transportation). Especially, for the company engaged in the aviation sector, their focus is on designing belts for transportation of luggage in such a way that allows replacing various parts of the belt and repairing when it is broken.

Regarding the handling of hazardous and non-hazardous waste in the Danish SMEs, the research has shown that it is at a very high level. This has been due to regulations but in addition there are a lot of audits that assist towards the improvement on this field. These audits, besides the government, are also implemented by the customers. An issue identified from this study is that, although they manage well their hazardous and non-hazardous waste, they usually do not keep formal records of them in their company. This is an issue and challenge that can be further improved in European SMEs (RO2).

Much emphasis is also put on using recycling materials as inputs in their production process. All SMEs reported that they see opportunity in the form of financial benefits from a well-established recycling process within the company (RO2).

Austria Recycling is of high importance in Austrian SMEs. A distinctive feature is also that clients ask for environmental improvements. For example, an SME designing car parts has been requested from a client in automobile industry to inquire ways for replacing halogen lamps with LED lamps. Another client, engaged in manufacturing of trains, asks for improving sustainable performance through the reduction of energy consumption in the developed type of trains or through choosing materials that can be recycled more easily after train vehicles reach their end of service.

It is a standard practice for SMEs in Austria to sell their waste to recycling companies, a practice that is both economically sustainable and environmentally friendly also (RO1). A good environmental practice exercised by an interviewed SME is the utilization of energy coming from biomass. This practice not only reduces costs but also results in a significant reduction in carbon footprint.

The current study also identified a shift in the transportation policies of SMEs. There are companies that in the last years try to shift their transport of materials and products from trucks to trains. This environmental practice is both economically oriented and environmentally friendly and can be further adopted as a key strategy national governments or European authorities (RO3).

Although the national trade associations provide assist to SMEs, the managers reported that there is no adequate support for sustainability enhancement by the trade

associations. Another problem identified is the lack of legislation guiding SMEs on how to apply sustainability practices (RO2).

Greece Greek SMEs are currently struggling with improving their efficiency regarding waste management and disposal in an environmentally friendly way. All interviewed managers and owners of the Greek SMEs stated that waste handling is an issue that required further improvement (RO2). This is also verified by the fact that the average waste reduction rate year by year on these companies is constantly less than 10%. However, although on average only a poor 20% of waste is separated by the company for recycling, there is also an optimistic view that indicates progress towards efficient handling of wastes due to the reporting of approximately 35% of reprocessing of waste and further utilized within the business.

Regarding energy consumption and efforts to reduce it, SMEs in Greece are mainly focused on make savings through efficient LED lighting (RO1). Another popular avenue, especially in the recent austerity years, is through the installation of photovoltaic (PV) cells in the rooftops of the company's premises.

All case studies analyzed in Greece are operating in the food and beverage industry sector and our research revealed a high environmental awareness and significant efforts towards reducing their environmental impact deriving from companies' activities. In particular, SME operating in the wine sector seeks to achieve adequate environmental performance in various ways, for instance, through preserving the local environment in both the agricultural and industrial level. In doing this, there are several certifications acquired by the company, relating to production and sale of wine as well as to the production of grapes. The SME operating in the sugar production is one of the first SMEs focused on reprocessing of their solid wastes, utilizing these wastes to improve acidic soils and the rest used in field fillings (rich in organic matter). Finally, SME operating in the dairy industry is certified with several environmentally friendly certifications (e.g., BRC 2013, IFS 2013, no genetically modified products).

The UK Level of waste reduction in British SMEs appears to be at an adequate level, with companies reporting that on average their performance on this is 35–40%. However, mixed waste still appears as the largest category of waste management (~35% of waste is disposed as mixed waste), whereas recycling is at the low level of 20%. Thus, more focus should be put on increasing recycling (RO3).

Reprocessing of waste within the company is generally at a good level and there are also many occasions where waste is sold to third parties, especially when we consider metal waste. Products are, in general, recycled. Circular economy practices of repair and reuse are generally well adopted by the UK SMEs. Recycling comes subsequently if repair and reuse fails.

Additionally, energy consumption is monitored and reduction measures are typically implemented.

Discussion

The literature on sustainability has mainly concentrated on the multinational larger companies, with research on SMEs being much less studied. To address this gap, we examine from a practical perspective (a) how SMEs in four European countries currently deal with sustainability strategies, (b) which are the main motivation factors for implementing these

strategies, along with the main barriers facing nowadays, and (c) potential strategies and avenues for further enhancing their sustainability performance.

The current research explores 12 SME cases located in four European countries, covering a diverse range of SMEs including micro-, small-, and medium-sized companies. Most of the selected companies belong to the manufacturing sector; however, there are also companies that are either processing and/or services oriented. Face-to-face interviews were carried with owners and senior managers of the selected SMEs towards identifying their attitude and performance in terms of the implementation of sustainability practices in their companies (see Table 2 in the Appendix for an analytical description of the implemented sustainability practices in the selected case studies). Special attention has been on identifying the communalities and differences as regards the drivers and barriers that motivate or keep away SMEs from implementation of sustainability practices. In this regard, there were identified both differences and similarities between the investigated SMEs at the country level.

The study has identified both internal barriers and external drivers that affect implementation of sustainability practices in the SMEs of the four European countries. Previous research recognizes external drivers as crucial for SMEs (see, e.g., [15]). Among these have been suggested as most important the various stakeholders (i.e. government, customers, suppliers) (see, e.g., [17–19, 70, 71]).

Another distinctive set of sustainability drivers is that of internal ones, focusing on the employees of SME, the organizational culture in the company, the personal commitment of owners/managers of SMEs, and other internal factors (see, e.g., [19, 20, 72–76]).

A significant outcome of the case studies interviews is that the external driver of legislation has played an important role in influencing SMEs to adopt and implement social practices into their business. However, the importance of this effect is varying by country, with Danish and Austrian SMEs being more closely monitoring by the government in order to comply with high standards of health and safety management in their company. On the other side, Greek SMEs are focusing more on achieving the standards of occupational safety rather on significantly improving health practices within their organization.

SMEs are also most interested in the implementation of sustainability practices that focus on carbon offsetting activities. Reduction of carbon footprint in their company is adopted by all SMEs, in the form of energy reduction and costs savings. In practice, this is mainly achieved through replacement of standard lighting with efficient LED lighting and control systems or by adopting circular economy practices such as reuse and repair. This environmental practice has been identified in almost all case studies, regardless of sector type and the country where SME is located. Hence, cost effectiveness is identified as a major driver for SMEs to engage with sustainability practices.

According to the case study responses and views of managers/owners of SMEs, their majority has acquired or currently seeks to obtain certifications promoting sustainability. This can be viewed as both internal and external driven, since that these certifications are directly or indirectly imposed by external stakeholders such as customers and/or suppliers; however, the main motivation has been found to be internal due to that SME managers generally believe that these certifications, besides the enhancement of their environmental and social practices, are a major moderator for attracting new customers and promote their business at the international level; hence, there are also significant economic incentives for the enterprises.

A quite positive and significant finding from this research is that generally the selected European SMEs are very environmentally friendly in terms of their waste management. It is found that only a small proportion (between 0 and 20%) of SMEs waste are disposed of as mixed waste. The highest percentages are separated for recycling, whereas there is also a large proportion of waste that is re-processed within the company.

The majority of companies interviewed reported that although it is common for them to keep track of their energy consumption, on the other hand, they do not usually keep track of their water consumption. The latter is an issue that has been identified by current research and should be given specific attention by interested parts.

Customers, through their demand for greener products, processes, and services, are also a major external driving factor forcing SMEs to implement sustainability practices into their management planning [18]. This has been verified partly also by the current research, since that few SMEs have reported that their clients have served as a driving force to impose sustainability practices into their businesses. According to Lee [77], small and medium enterprises are engaged more and more in green supply chain due to the readiness of their suppliers. In the same line, Ghadge et al. [19] highlight the significant role of SME suppliers in motivating SMEs towards sustainability. The current research, however, did not identify the external driver of suppliers as one of the most important ones, since collaboration between SMEs and their suppliers is mostly based upon economic aspect of sustainability.

In overall, the current study has examined carefully and in depth the behavior and management of selected SMEs in four countries to find that internal/external drivers for leading SMEs to adopt sustainability practices can be generally divided into four sub-categories. Hence, SMEs implement sustainability practices mainly due to their cost effectiveness, for obtaining accreditation, due to government laws and legislation, and to reduce their carbon footprint. Current research found that these practices are mainly due to the personal commitment of the owner or manager(s) of the SME, followed by the pressures from national government (mostly through imposing related legislation). On the other hand, much less pressure has been found to come from the customers and suppliers.

As regards the most important barriers preventing SMEs to incorporate sustainability practices into their business, the current research has identified that the most common among the examined European SMEs' barriers is the lack of a clear legislation on behalf of governmental bodies and other legislation bodies, towards the implementation and promotion of sustainable practices by SMEs.

Lack of support by the government in implementing sustainability practices has been reported mainly by Greek SME case studies as the most important barrier for negatively affecting implementation of sustainability practices. However, this finding has been also met in SMEs from other countries, in the sense that there has been clearly identified a lack of guidance from government that prevents them from improving the scope of their sustainability targets and programs.

Although the relative certifications include some guidelines on implementation of sustainability practices, most SMEs argue that there are certain difficulties in applying these guidelines due to lack of specialized knowledge on these issues within the company. As a result, many SMEs are turning to external consulting on sustainability for more detailed and specialized advice from these external resources.

As a more general comment, it has been found by the current research that all three pillars of sustainability (i.e., economic, environmental and social) were visible in the case studies examined; however, these three aspects were used with different weights, depending on country or sector variations.

As concerns certain proposals emerging from this research for the enhancement of the sustainability levels in European SMEs, these can be summarized in the following. Regarding the economic aspects of sustainability, one may suggest that reduced bureaucracy and simpler procedures for receiving funding as well as the provision of incentives to SMEs to engage more with local suppliers will have visible effects on the economic performance of SMEs. This finding has been identified to have geographical differences, as the issue is more apparent in Greek SMEs where collaboration with local suppliers is scant and SMEs struggle to find funding opportunities

in comparison to primarily the Danish and Austrian SMEs and secondary British SMEs. From a social perspective, additional focus can be given on the acquisition of more social-oriented certifications by SMEs, such as the IFC or the FSC for instance. Another issue that emerged from this paper and needs further consideration by the interested stakeholders is the geographical variations on the level of engagement with health promoting in working areas, which suggests that more attention should be given by the authority bodies and stakeholders on these areas that are lagging behind. Finally, from the environmental point of view, future focus should be given on enhancing recycling and related practices. One option that seems to gain many supporters is selling SMEs' waste to recycling companies. Emphasis can be also given towards changing the transportation practices in SMEs, e.g., through transfer of materials/products via more environmentally friendly means of transportation such as trains.

In practice, these results can help managers and policy makers to identify and understand what are currently the standard sustainability practices SMEs apply in their business management, as well as the main problems and barriers that avoid SMEs to reach adequate sustainable development levels.

Tables 3 and 4 in the Appendix provide a summary of the main findings of the study and propose key strategies for bypassing barriers to achieve sustainability goals. Specifically, Table 3 summarizes issues and challenges for the SMEs, whereas Table 4 presents our proposals/strategies for enhancing sustainability in European SMEs.

Conclusions

The purpose of the current paper was the examination of how European SMEs deal with sustainability strategies and how these strategies are integrated into their organization management. In particular, we investigated from a practical point of view, how the economic, environmental, and social aspects of sustainability are considered by SMEs in different European countries and how they are related to each other. It is expected that both stakeholders and managers of SMEs will benefit from this study, by understanding in more depth how and which sustainable management practices are implemented in SMEs and how these practices help in achieving better performance. The paper provides insights in comparison as how the SMEs across four nations implement their sustainability practices. Especially, the SMEs' social performances in different nations vary. The research helps in comparing and improving the social performance along with managerial performance on other two aspects of sustainability (economic, environmental) based on the country specific policies and practices. The managers can use the research in understanding the requirements of the stakeholders and taking appropriate steps for improving sustainability in their SMEs.

As a limitation of this study, we may refer to the number of case studies and countries chosen. The limitation of the current multi case study approach is generalization. The case studies considered have been utilized to establish the sustainability practices in the European countries. This is to be understood that the cases considered are used for generalization. Hence, further use of SME cases can help in increasing the validity of the study. To this end, future research could extend the number of SMEs interviewed as well as the countries can be extended in order to have a more representative sample and validate the results of the current paper in other national terrains. Action research could also contribute to a better understanding of sustainability management in SMEs, providing fruitful insights of implementation over time and shedding light on underlying enabling conditions and key success factors.

Appendix

Table 2 Description of the three dimensions of sustainability in the case studies SMEs

Case study	Economic dimension	Environmental dimension	Social dimension
SME 1	<p>The company has shown large financial development in the last 10 years. Annual turnover in the last years is around 1.5 million euros. During the previous financial year, the company showed profits with a significant turnover growth. Emphasis is put on enhancing collaborations with local suppliers (> 50% of total suppliers), whereas the wages are considered to be higher compared to the average wage in the sector</p>	<p>The company gives strong emphasis on the environmental dimension of sustainability. Main attention is given in the reduction of energy consumption and water consumption. Replacing existing lighting with energy efficient LED lighting has been recently implemented. Installation of photovoltaic panels in the roof of the factory is under development. Also, recycling of the glass from their production process is largely supported by the company. Regular checks for potential environmental hazards on bottles are also performed. Another good practice is the use of recycled carton and glass as material inputs. Due to the nature of the business, where water wastes are produced, a water purified system is planned to be purchased</p>	<p>The occupational health and safety management system standards in the company are at a high level. Significant emphasis is placed in the training of their personnel. Due to the complexity and nature of the machinery in the factory, employees often attend training programs abroad in order to be to upgrade their skills and be fully trained for the safely handling of the machines. The SME has never received fines or non-monetary sanctions for non-compliance with employment laws. In terms of products/services safety, the company complies with all standard procedures. In addition to the standard certifications, such as ISO 9001, more specialized certifications have been acquired, such as the NSF certification</p>
SME 2	<p>The company is a family business that activates in the food sector. Its annual turnover is around 15 million euros, with a turnover growth of approximately 20%. The previous financial year ended with 10% profits</p> <p>The company employs a total number of 132 employees, and in the last years they have increased their exports to 13 countries besides Greece. Another important achievement is that currently the 1.5% of Greek cow milk is produced in the company's farms. Currently, their dairy daily milk production is 25 tones</p>	<p>Most emphasis concerning the environmental aspects of sustainability in the company is given currently on recycling and on issues relating to handling of the hazardous and non-hazardous waste derived from their production process. Most of their waste is organic, and the target is to have a reduction of 10% every year on this waste material</p>	<p>The company's level of health and safety is at a high level, and this is also true for the level of training employees receive. In addition, the company's workers engage and frequently provide input in health and safety hazard identification and risk assessment. Much care is taken towards providing accessible and adequate information on the safe use of their organic products, their disposal, or the sourcing of its ingredients</p> <p>Besides standard certifications, such as ISO 9001 and ISO 14001, the company has acquired additional food quality standards certifications, such as IFS and BRC</p>

Table 2 (continued)

Case study	Economic dimension	Environmental dimension	Social dimension
SME 3	<p>Annual average turnover is around 3.2 million euros. The turnover growth % in two previous years was approximately 5%, however the previous financial year ended with approximate 15–20% losses. The company's infrastructure development in the last 5 years is negligible, whereas company's salary spending's remain stable. Wages are considered to be higher than the country and sector average</p>	<p>There is strong emphasis on keeping low levels of energy and water consumption in the production process. Also, significant attention is given on having negligible negative environmental impacts in the supply chain, although due to the nature of the company there are a lot of waste produced, such as fluids and solid and aerial wastes. Specifically, more than 50% of total wastes are undergo re-processing within the business factory</p>	<p>Health and safety standards are kept at the average level, with most of the lagging being due to the minimum levels of occupational health and safety training in terms of the specific work-related hazards and to the difficulty to participate in employee training programs to upgrade their skills. In the past 5 years, the company had one case of fine and non-monetary sanction for non-compliance with employment laws, which has resulted in a significant impact of that cost. Among the positive impacts of the company in the social dimension of sustainability is the spending of approximately 10,000 euros in CSR activities</p>
SME 4	<p>This SME, employing a number of 40 employees, produces mineralized wood chip boards. Although a family business, it is run by an appointed manager. Turnover growth in the previous 2 years is approximately 5%, whereas the previous year ended with significant profits. The company is mostly relying on local suppliers, providing them with wood and cement (> 50% of their spending's). The rest of their supplies are imported from Slovenia</p>	<p>Utilization of recycling materials as raw materials for use in their production process is a main target in the company. It is interesting that the SME recycles their own produced waste materials by 100%. Also, energy consumption is formally monitored within the company. The company has installed during the last year an electricity monitoring system that can provide detailed information on energy consumption. Currently, replacement of stand-ard lighting with LED lights is undergone in all premises of the company, already showing large savings in their energy consumption bills</p>	<p>Health and safety are at the standard level, according to the general regulations for such type of company. A distinctive feature is that workers are required to wear earplugs protection due to noise. The company provides customized earplugs to every worker in order to maximize the protection level for every employee in the factory. The company had previously ISO 9001 certification; however, they have not pursued this nowadays since the customers were not interested on certifications</p> <p>The AUYA (the Austrian Workers' Compensation Board) performs frequent visits to SMEs in order to ensure all relevant rules, regulations, and standards relating to occupational risks are followed</p> <p>The company has an occupational health and safety management system in place. Workers participate and provide their inputs in health and safety hazard identification at a regular basis. There are also frequent organized training programs for employees, or paying for outside personal training of an employee. The company promotes diversity within their organization, for example through hiring people from other countries. Among their priorities is also to hire people from their local community</p>
SME 5	<p>This manufacturing and trading SME, producing components for handling equipment employs 70 employees and it is a family business. Although the company is growing fast during the last years (the company's infrastructure development in the last 5 years is above 50%), the cost reduction is a performance indicator that they are not performing well at the current period</p> <p>Wages in the company are at the average level. Proportion of spending's on local suppliers is around 40%; however, due to restrictions from clients or due to reducing costs, they use also international suppliers (e.g., from China)</p>	<p>The company scores high at keeping formal records of the raw materials and goods-parts used in production. Concerning wastes produced, although they do not recycle, they sell the waste (metals) to another company for use. As regards the rest of waste (paper, plastic), the SME plans to purchase a machine from a local supplier that will collect, press it and produce cubes that will be sold to another company. Regarding the monitoring of harmful parts of their products and waste, a supplier associated with the galvanizing of products has been assigned with this responsibility</p>	<p>The company has an occupational health and safety management system in place. Workers participate and provide their inputs in health and safety hazard identification at a regular basis. There are also frequent organized training programs for employees, or paying for outside personal training of an employee. The company promotes diversity within their organization, for example through hiring people from other countries. Among their priorities is also to hire people from their local community</p>

Table 2 (continued)

Case study	Economic dimension	Environmental dimension	Social dimension
SME 6	<p>The packaging company produces confectionery boxes and FMCG (fast-moving consumer goods) boxes. The number of employees is approximately 250, and it is a family business directed by an appointed manager. Main products include coffee and pizza boxes and more generally fast moving consumer goods products. There exists a detailed financial target for the next year and additionally a rough economic plan for the next 5 years. Previous financial year ended with 10% profits, and the aim in the following years is to achieve a 5% cost reduction. Wages in the company are at the average level as per the industry.</p> <p>They are struggling to find local suppliers due to the specific nature of the supply goods (45% is carton board). Currently, the proportion of spending on local suppliers is ~35%, with supplies arriving from a certain region in Austria</p>	<p>A major goal is to increase the recycled products. Currently, 50% of their raw materials used in their production process are recycled carton board. However, there are difficulties in this since that — especially in the food market production — the customers are hesitating to use recycled carton board, although the latter is ecology friendly, energy efficient and cheaper compared to the virgin carton board. Concerning the screening of their suppliers in terms of their environmental management and performance, it is highly ranked within the SME especially due to the restrictions posed by the environmental certificates the company has acquired. Most environmental footprint of the company is due to the large amount of transportation for their products. In order to reduce CO₂ emissions resulted from transportation of their goods, the company attempts to shift from trucks to trains for product moving. Recently, they have taken initiatives towards reducing the energy consumption through renewing equipment for heating and cooling. Also, renewing the roof of the factory has achieved a 17% reduction in heating costs. Finally, waste in the form of paper is sold to recycling company, obtaining a 10% of the initial price of the product</p>	<p>They have standard occupational health and safety system in place since this is required by the ISO and BRC certifications safety management. There is also yearly employee training in health and safety. Regular meetings every 1–2 months between groups of employees and committees in order for the former to provide their inputs in health and safety hazards within the company</p> <p>Besides the certifications of ISO 9001 and ISO 14001, the company has acquired additional food quality standards certifications, such as PFC and PFSC. Also, BRC has been acquired, which is one of the highest ranking food market certification</p> <p>Finally, the company spends yearly an amount between 5000 and 1000 euros on CSR activities</p>

Table 2 (continued)

Case study	Economic dimension	Environmental dimension	Social dimension
SME 7	<p>This manufacturing SME is an owner-managed family business producing plastic/technical parts for technical packaging. Total revenue in the previous financial year was approximately 2.5 million euros, with a turnover growth in the two previous years of 5–6%. Also, cost reductions in the previous years were less than 2%. The company does not spend at all on donations or charities and the employee wages are at the average country level, however there is a salary spending development in the last 5 years of around 10%. Regarding local suppliers, more than 50% of their raw materials are from Danish companies; however, a large part of raw materials is not produced in the country and they are forced to provide from abroad</p>	<p>In terms of their environmental practices and performance, they put much emphasis on utilization of recycling materials as inputs in their production process. Also, keeping truck on their energy consumption is essential since their environmental footprint is most on the energy consumption. For reducing the latter, they seek to invest in solar panels, whereas they have already changed regular lighting with LED and observed large improvements in energy consumption reductions</p> <p>Waste produced by the company is mainly plastic and secondary metal. Seventy percent of their waste is re-processed within the business, 20% is disposed as mixed waste, and there is a 10% that is sold to third parties (e.g., old tools and machinery)</p>	<p>According to the manager of the SME, there is no formal occupational and health internal system in the company since that the country laws and regulations are strict and well applied. There are frequent visits from the governmental inspectors and they also keep records of health and safety data within the enterprise</p> <p>The company has an ISO 9001 certification. In addition, the SME has a UL certification and recognition which means that the products of the company have successfully met stringent requirements</p>
SME 8	<p>The company employs 75 employees and is engaged in the medical and pharmaceutical business sector, with main products being probiotics. Their customers are international, located mainly in Europe, Asia, the USA, and South Africa. The SME is directed by an appointed manager. The previous financial year the total revenue of the company was 10 million euros. Wages in the company are somewhat below the average wage in the relevant industry. Recently, the company started setting targets on new investments, with main concentration being on obtaining new machinery. The suppliers are more or less the same in the last 10 years, since they have as priority their loyalty to their suppliers</p>	<p>Regarding environmental management in the company, it is at the standard typical level of the country standards. The SEM is lagging currently in terms of their recycling processes. Most of their waste is plastic and powder; however, powder cannot be recycled. On the other hand, concerning the water consumption efficiency, the company scores high. Due to the nature of the company and products, they use a lot of water, which is completely recycled</p>	<p>There are high standards of health and safety management systems in the company, and it is an issue that they are focused on, since it is regularly monitored by both the government and customers. Training on occupational health and safety as well as on programs for upgrade of skills of the employees is also strongly encouraged and implemented. There are also frequent assessments of any potential health and safety impacts from their products in order to ensure customer protection. Since the company is located far from large cities and the capital, they are seeking ways to promote the company to the local community. Hiring from local areas is a primary target for the specific SME. The company has an ISO 9001 certification</p>

Table 2 (continued)

Case study	Economic dimension	Environmental dimension	Social dimension
SME 9	<p>This small SME, employing less than 10 people, is engaged in the logistics and transportation sector, and especially in the aviation. Products are mainly baggage handling and ground handling products for airports. Their goal is to help move from manual handling systems in the airports, by introducing automated or semi-automated systems. It has been recently established and seeks to expand through rapid development. The total revenue in the previous financial year was between 0.5 and 1 million euros, with a turnover of above 50%. Especially the previous year ended with losses (approximately 40%) since that they have made large investments. Salaries in the company are higher than the country average. Most of their suppliers are Danish, especially those associated with hardware. Software suppliers are mainly from Canada</p>	<p>Since the company is not in the manufacturing sector, they do not keep formal records of raw materials. This also holds for waste and energy consumption. However, in a more informal way, they are focused in resource efficiency and environmentally friendly practices. Wastes produced are mainly metals and plastic, which they try to reduce at a 10% rate in the last 2 years</p>	<p>In Denmark, there are strict health and safety regulations which are required to follow. Aviation industry has additional regulations that should follow. However, the specific SME seeks ways of being above the standard health and safety legislations since that this will improve their image (customers demand very high health and safety standards)</p>
SME 10	<p>The SME, currently employing a total number of 46 personnel, is engaged in the printing sector. During the last years, they are trying to expand either by introducing new products or by investing to new machinery. However, currently investment plans set by the company vary by year to year (e.g., from 30,000 pounds to half a million pounds). The ultimate goal is to promote themselves as an innovative company in the printing sector</p>	<p>The company seeks to improve on their environmental management policies. Most important practice concerning their environmental management and performance is their shift from standard to environmentally friendly products. For example, the ink that is nowadays used for their products is vegetable-based. Also, all color paint they are currently using is chemical-free. Another reason for using environmentally friendly products is due to the pressures from the government</p> <p>Currently, they do not have a management structure with clear accountability for carbon footprint and energy consumption. They have only some informal checks They are aware of their legal obligations concerning the regulatory compliance with environmental issues, but still do not have evidence of full compliance with periodic independent verification or audits or any other regularly updated formal processes. Also, they do not have any carbon footprint or energy consumption baseline. Their waste composes of pallets, paper wraps, and paper boxes, most of which is recycled</p>	<p>Their health and safety standards are very high. They perform regular safety checks every 6 months. Among the good practices is that their management changes adequately in response to responding to any changes in the business environment. Interior of both the factory and the offices of the company makes a very good impression to the visitors. They also provide accessible information on the safe use of their products, their disposal, and the sourcing of its components to the customers</p>

Table 2 (continued)

Case study	Economic dimension	Environmental dimension	Social dimension
SME 11	<p>The SME runs from 1920 and is a family business which now runs by an appointed manager. Main products are timber, doors, as well as other partitioning in the building sector. The total revenue in the previous years is around 5 million euros, and the turnover growth is approximately 20%. The employee wages as per the industry is average to higher. The main target in supplying is through local areas, although their needs cannot be fully addressed by local suppliers</p>	<p>There are formal systems implemented within the SME, regarding keeping records of raw materials in their production and recycling materials and records of their energy and water consumption. A lagging issue within the company is the lack of initiatives towards reducing their water consumption, which currently is at a high level. In general, resource efficiency in the SME is currently at a medium level. Type of waste is diverse, including metals, plastic, paper and glass. At the time, the highest percentage of waste reduction is achieved on paper waste (around 40%), whereas the company is still behind in terms of their metals waste reduction. In overall, of their total waste, 40% is disposed as mixed waste, 40% is re-processed within the business, and 20% is separated for recycling</p>	<p>Occupational health and safety management systems in the company could be more improved; however, there is currently good performance as regards the participation of company's employees in health and safety hazard identification. Also, training on both health issues and personal training opportunities is at a good level</p> <p>The company has acquired a series of certifications, such as ISO 9001 (acquired in 2012), ISO 14901 (acquired in 2019), IFC, and FSC (both acquired in 2014). FSC (Forest Stewardship Council) certification is targeted for companies associated with wood or fiber-based products</p>
SME 12	<p>The company runs from 1970 in the West Midlands, UK, in the field of manufacturing of precision metal pressings and metal stampings, providing value-adding, end-to-end solutions through closely working with their customers. Currently, there are strong collaborations with local suppliers and customers that helps to source materials optimally</p>	<p>The SME gives attention in the environmental part of sustainability. In doing this, they provide training to employees to adopt sustainability practices including energy efficiency and waste management. Adoption of renewable energy strategies is also a long term target for the company</p> <p>The products are 100% recyclable. Wastes from raw materials, work in progress, and finished products within plant premises are recycled through third party. However, the end products remain at the discretion of the customers</p>	<p>Training in the company on both health issues and personal training opportunities is at the standard level. Certifications of ISO 9001 and 14001 help practicing standardized approach all through the organizational value chain of the company</p>

Table 3 Issues and challenges for European SMEs as identified by the current study on selected cases

Subconstruct of sustainability	Challenge
Economic	Bureaucracy and complex procedures for funding receive by SMEs
Economic/social	Lack of external incentives for SMEs to engage with local suppliers
Economic/social/environmental	Lack of clear legislation towards the implementation of sustainability practices
Economic/social/environmental	Lack of adequate support by stakeholders (government, trade associations) for improving sustainability through provision of guidelines
Social/environmental	Lack of external support by suppliers towards implementing social and environmental sustainability practices on behalf of the SMEs
Social/environmental	Lack of expertise and specialized knowledge on behalf of SMEs in order to apply guidelines of social and environmental certifications
Economic/environmental	Lack of formal internal procedures towards promoting sustainability (e.g., keeping formal records concerning waste management, water consumption, recycling)

Table 4 Key strategies (proposals) for European SMEs as identified by the current study on selected cases

Sub-construct of sustainability	Implemented by:	Proposal
Environmental/ social	Government	Provide incentives to SEMs to acquire environmental/social certifications
Social	Government	Provide incentives to SMEs to engage/collaborate with local suppliers
Economic	Government	Reduce bureaucracy/simplify procedures for access of SMEs to funding
Economic/envi- ronmental	SMEs	Energy management: - Keep track of water/energy consumption - Replacement of older equipment - Utilize energy from biomass - Switch to electric vehicles - Shift transportation of products from tracks to railways - Install photovoltaic cells - Establish standardized procedures for environmental and energy audits
Economic/envi- ronmental	SMEs	Waste management: - Sell waste to recycling waste companies - Implement re-use, repair and recycle of resources practices (materials, water, etc.)
Social	SMEs	Employee wellbeing: - Provide training - Provide flexibility (e.g., flexible working hours policies, ability working from home, provision for employee benefits)
Social	SMEs	Engagement with local community to promote SME: - Establish donation/charity scheme to support local community - Sponsoring of public health activities in local community

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Declarations

Competing Interests The authors declare no competing interests.

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References


- Jiang L, Li X (2010) Discussions on the improvement of the internal control in SMEs. *Int J Bus Manag* 5(9). <https://doi.org/10.5539/ijbm.v5n9p214>
- Dey PK, Malesios C, De D, Chowdhury S, Abdelaziz FB (2019) The impact of lean management practices and sustainable oriented innovation on sustainability performance of small and medium sized enterprises: empirical evidence from the UK. *Br J Manag*. <https://doi.org/10.1111/1467-8551.12388>
- Commission E (2015) User guide to the SME definition. Publications Office of the European Union, Luxembourg
- Williamson D, Lynch-Wood G, Ramsay J (2006) Drivers of environmental behaviour in manufacturing SMEs and implications for CSR. *J Bus Ethics* 6(3):317–330
- Annual report on European SMEs 2017/2018. Available at: https://ec.europa.eu/growth/smes/business-friendly-environment/performance-review_el#annual-report. Accessed Nov 2019
- Brammer S, Hojmosse S, Marchant K (2012) Environmental management in SMEs in the UK: practices, pressures and perceived benefits. *Bus Strateg Environ* 21(7):423–434
- Dey PK, Malesios C, Abdelaziz FB, Chowdhury S, De D (2019) Could lean and innovation enhance supply chain sustainability of small and medium sized enterprises? *Bus Strateg Environ* 28:582–598
- Coldwell D, Venter R, Joosub T, Duh H (2022) The tension between SMEs' Growth and sustainability in emerging and developed countries' internationalization: towards a conceptual model. *Sustainability* 14(8):4418. <https://doi.org/10.3390/su14084418>
- Tukker A, Ellen G, Eder P (2000) Ecodesign - strategies for dissemination to SMEs - part 1 - overall analysis and conclusions. Available at <http://ftp.jrc.es/EURdoc/eur19740en.pdf>. Accessed Nov 2019
- Reyes-Rodríguez JF, Ulhøi JP, Madsen H (2016) Corporate environmental sustainability in Danish SMEs: a longitudinal study of motivators, initiatives, and strategic effects. *Corp Soc Responsib Environ Mgmt* 23:193–212
- Metaxas T, Tsavdaridou M (2010) Corporate social responsibility in Europe: Denmark, Hungary and Greece. *J Contemp Eur Stud* 18(1):25–46
- Battistella C, Cagnina MR, Cicero L, Preghenella N (2018) Sustainable business models of SMEs: challenges in yacht tourism sector. *Sustainability* 10:3437
- Lawrence SR, Collins E, Pavlovich K, Arunachalam M (2006) Sustainability practices of SMEs: the case of NZ. *Bus Strateg Environ* 15:242–257
- Rodgers C (2010) Sustainable entrepreneurship in SMEs: a case study analysis. *Corp Soc Responsib Environ Manag* 17(3):125–132
- Studer S, Welford R, Hills P (2006) Engaging Hong Kong businesses in environmental change: drivers and barriers. *Bus Strategy Environ* 431:416–431
- Yadav N, Gupta K, Rani L, Rawat D (2018) Drivers of sustainability practices and SMEs: a systematic literature review. *Eur J Sustain Dev* 7(4):531–544
- Cambrá-Fierro J, Ruiz-Benitez R (2011) Sustainable business practices in Spain: a two-case study. *Eur Bus Rev* 23(4):401–412

18. Saez-Martinez FJ, Diaz-Garcia C, Gonzalez-Moreno A (2016) Factors promoting environmental responsibility in European SMEs: the effect on performance. *Sustainability* 8(9). <https://doi.org/10.3390/su8090898>
19. Ghadge A, Kaklamanou M, Choudhary S, Bourlakis M (2017) Implementing environmental practices within the Greek dairy supply chain. *Ind Manag Data Syst* 117(9):1995–2014
20. Masurel E (2017) Why SMEs invest in environmental measures: sustainability evidence from small and medium-sized printing firms. *Bus Strateg Environ* 16(3):190–201
21. Neri A, Cagno E, Trianni A (2021) Barriers and drivers for the adoption of industrial sustainability measures in European SMEs: empirical evidence from chemical and metalworking sectors. *Sustain Prod Consum* 28:1433–1464. <https://doi.org/10.1016/j.spc.2021.08.018>
22. Aboelmaged M (2018) The drivers of sustainable manufacturing practices in Egyptian SMEs and their impact on competitive capabilities: a PLS-SEM model. *J Clean Prod* 175:207–221
23. Agan Y, Acar MF, Borodin A (2013) Drivers of environmental processes and their impact on performance: a study of Turkish SMEs. *J Clean Prod* 51:23–33
24. Cherrafi A et al (2018) Lean, green practices and process innovation: a model for green supply chain performance. *Int J Prod Econ* 206:79–92
25. de Oliveira UR, Souza Espindola L, Rocha da Silva I, da Silva IN, Martins Rocha H (2018) A systematic literature review on green supply chain management: research implications and future perspectives. *J Clean Prod* 187:537–561
26. Juniarty M, Ismail Y (2015) Analyzing sustainability of SMEs in automotive component industry in Bekasi regency. *Asian J Sci Res* 5(12):522–533
27. MOE, Ministry Of environment (2016) National action plan for sustainable consumption and production (SCP) in Egypt. Ministry of Environment, Egypt
28. Rao P, Holt D (2005) Do green supply chains lead to competitiveness and economic performance? *Int J Oper Prod Manag* 25(9):898–916
29. Garza-Reyes JA, Kumar V, Chaikittisilp S, Hua Tan K (2018) The effect of lean methods and tools on the environmental performance of manufacturing organisations. *Int J Prod Econ* 200:170–180
30. Hosseininia G, Ramezani A (2016) Factors influencing sustainable entrepreneurship in small and medium-sized enterprises in Iran: a case study of food industry. *Sustainability* 8:1010. <https://doi.org/10.3390/su8101010>
31. Courrent JM, Chassé S, Omri W (2018) Do entrepreneurial SMEs perform better because they are more responsible? *J Bus Ethics* 153:317. <https://doi.org/10.1007/s10551-016-3367-4>
32. Mafini C, Loury-Okoumba WV (2018) Extending green supply chain management activities to manufacturing small and medium enterprises in a developing economy. *SAJEMS* 21(1):a1996. <https://doi.org/10.4102/sajems.v21i1.1996>
33. Rezaei G, Sumin V, Mohamed Z, Shamsudin MN, Sharifuddin J (2016) Implementing green practices as sustainable innovation among herbal-based SME entrepreneurs. *J Food Prod Mark* 22(1):1–18. <https://doi.org/10.1080/10454446.2015.1048030>
34. Aragon-Correa J, Hurtado-Torres NE, Sharma S, García-Morales VJ (2008) Environmental strategy and performance in small firms: a resource-based perspective. *J Environ Manage* 86(1):88–103
35. Idris SNA, Hami N, Yamin FM (2017) The impact of green manufacturing on environmental sustainability among SMEs in Malaysian manufacturing sector. Retrieved from: <http://stmlportal.net/stmlgogreen2016/pdf/p773.pdf>. Accessed Nov 2019
36. Susanty A, Santoso H, Sari DP, Parasayu S (2017) Effect of internal green supply chain practices on environmental performance of SMEs of wooden furniture industry. Proceedings of the World Congress on Engineering 2017 Vol II WCE 2017, July 5–7, 2017, London, U.K
37. Pan X, Li S (2016) Dynamic optimal control of process-product innovation with learning by doing. *Eur J Oper Res* 248(1):136–145
38. Chileshe N, Rameezdeen R, Hosseini MR, Lehmann S, Udeaja C (2016) Analysis of reverse logistics implementation practices by South Australian construction organisations. *Int J Oper Prod Man* 36(3):332–356
39. Dey PK, Petridis NE, Petridis K, Malesios C, Nixon JD, Ghosh SK (2018) Environmental management and corporate social responsibility practices of small and medium-sized enterprises. *J Clean Prod*. <https://doi.org/10.1016/j.jclepro.2018.05.201>
40. Álvarez Jaramillo J, Zartha Sossa JW, Orozco Mendoza GL (2018) Barriers to sustainability for small and medium enterprises in the framework of sustainable development—literature review. *Bus Strateg Environ*: bse.2261. <https://doi.org/10.1002/bse.2261>
41. Candele S, Zardini A (2018) Is sustainability a competitive advantage for small businesses? An empirical analysis of possible mediators in the sustainability-financial performance relationship. *J Clean Prod* 182:166–176

42. Hillary R (1997) Environmental management systems and cleaner production. John Wiley & Sons Ltd, Chichester
43. Battaglia M, Testa F, Bianchi L, Iraldo F, Frey M (2014) Corporate social responsibility and competitiveness within SMEs of the fashion industry: evidence from Italy and France. *Sustainability* 6:872–893. <https://doi.org/10.3390/su6020872>
44. McKeiver C, Gadenne D (2005) Environmental management systems in small and medium businesses. *Int Small Bus J* 23(5):513–537
45. Aldana SG (2011) Financial impact of health promotion programs: a comprehensive review of the literature. *Am J Health Promot* 5:296–320
46. Madsen H, Ulhøi J (2015) Stakeholder pressures, environmental impact and managerial initiatives of SMEs: a longitudinal study. *J Transdiscipl Environ Stud* 14(1):13e22
47. Suriyankietkaew S, Avery G (2016) Sustainable leadership practices driving financial performance: empirical evidence from Thai SMEs. *Sustainability* 8:327. <https://doi.org/10.3390/su8040327>
48. Hoffman A (2005) Denmark's innovation capacity—from benchmarking to policy priorities; FORA, Division for Research and Analysis, Ministry of Business and Economic Affairs; Copenhagen, Denmark, 2005
49. Choongo P, van Burg JC, Paas LJ, Masurel E, Lungu J (2017) Corporate social responsibility motivations in Zambian SMEs. *IRE* 15(1):29–62
50. Sarango-Lalangui P, Álvarez-García J, del Río-Rama MC (2018) Sustainable practices in small and medium-sized enterprises in Ecuador. *Sustainability* 10:2105
51. Sajan MP, Shalij PR, Ramesh A, Biju Augustine P (2017) Lean manufacturing practices in Indian manufacturing SMEs and their effect on sustainability performance. *J Manuf Technol Manag* 28(6):772–793
52. Bartel AP (2004) Human resource management and organizational performance: evidence from retail banking. *ILR Rev* 57(2):181–203
53. Graafland J, Van de Ven B, Stoffele N (2003) Strategies and instruments for organizing CSR by small and large businesses in the Netherlands. *J Bus Ethics* 47(1):45–60
54. Godos-Díez J-L, Fernandez-Gago R, Martínez-Campillo A (2011) How important are CEOs to CSR practices? An analysis of the mediating effect of the perceived role of ethics and social responsibility. *J Bus Ethics* 98(4):531e548
55. Crals E, Vereeck L (2005) The affordability of sustainable entrepreneurship certification for SMEs. *Int J Sustain Dev* 12(2):173–184
56. OHSAS (2007) OHSAS 18001 occupational health and safety management systems – requirements, Serie De Evaluacion En Seguridad Y Salud Ocupacional. NEN, Delft
57. Marques F, Mendonça PSM, Jabbour CJC (2010) Social dimension of sustainability in retail: case studies of small and medium Brazilian supermarkets. *Soc Responsib J* 6:237–251
58. Urban B, Naidoo R (2012) Business sustainability: empirical evidence on operational skills in SMEs in South Africa. *J Small Bus Enterp Dev* 19(1):146–163
59. Menguc B, Ozanne L (2005) Challenges of the green imperative: a natural resource-based approach to the environmental orientation-business performance relationship. *J Bus Res* 58(4):430–438
60. Soto-Acosta P, Cismaru D-M, Vatamanescu E-M, Ciochina RS (2016) Sustainable entrepreneurship in SMEs: a business performance perspective. *Sustainability* 8:342. <https://doi.org/10.3390/su8040342>
61. Maletic M, Maletic D, Dahlgaard JJ, Dahlgaard-Park S, Gomiscek B (2016) Effect of sustainability-oriented innovation practices on the overall organisational performance: an empirical examination. *Total Qual Manag Bus Excell* 27(9–10):1171–1190
62. Fombrun C, Shanley M (1990) What's in a name? Reputation building and corporate strategy. *Acad Manag J* 33(2):233e258
63. Yin RK (2011) Applications of case study research. OSMOS Corporation, Sage, London
64. Yin R, Davis D (2007) Adding new dimensions to case study evaluations: the case of evaluating comprehensive reforms. *New Dir Eval* 113:75–93
65. Miles MB, Huberman AM (1994) Qualitative data analysis: an expanded sourcebook. Sage, London
66. Barney J (1991) Firm resources and sustained competitive advantage. *J Manage* 17(1):99–120
67. Clement K, Hansen M (2003) Financial incentives to improve environmental performance: a review of Nordic public sector support for SMEs. *Eur Env* 13:34–47
68. Falle S, Rauter R, Engert S, Baumgartner RJ (2016) Sustainability management with the sustainability balanced scorecard in SMEs: findings from an Austrian case study. *Sustainability* 8:545
69. Voss C, Tsikriktsis N, Frohlich M (2002) Case research in operations management. *Int J Oper Prod Manag* 22(2):195–219
70. Battisti M, Perry M (2011) Walking the talk? Environmental responsibility from the perspective of small-business owners. *Corp Soc Responsib Environ Manag* 18(3):172–185

71. Shields JF, Welsh DHB, Shelleman JM (2018) Sustainability reporting and its implications for family firms. *J Small Bus Strategy* 28(1):39–44
72. Wahga AI, Blundel R, Schaefer A (2017) Understanding the drivers of sustainable entrepreneurial practices in Pakistan's leather industry. *Int J Entrepreneurial Behav Res* 24(2):382–407
73. Gandhi NS, Thanki SJ, Thakkar JJ (2018) Ranking of drivers for integrated lean-green manufacturing for Indian manufacturing SMEs. *J Clean Prod* 171. <https://doi.org/10.1016/j.jclepro.2017.10.041> (Elsevier B.V.)
74. Thanki SJ, Thakkar J (2018) Interdependence analysis of lean-green implementation challenges: a case of Indian SMEs. *J Manuf Technol Manag*. <https://doi.org/10.1108/JMTM-04-2017-0067>
75. Ghazilla RAR, Sakundarini N, Abdul-Rashid SH, Ayub NS, Oluju EU, Musa SN (2015) Drivers and barriers analysis for green manufacturing practices in Malaysian SMEs: a preliminary findings. *Procedia CIRP* 26:658–663
76. Vargas-Hernández JG (2021) Strategic organizational sustainability. *Circ Econ Sust* 1:457–476
77. Lee S (2008) Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives. *Supply Chain Manag* 13(3):185–198

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