Why we need to support the environmental compliance needs of European SMEs

Gary Lynch-Wood and David Williamson
Centre for Research into Corporate Responsibility and the Environment

ABSTRACT

An eighteen-month study of 66 small and medium sized-enterprises (SMEs) in four European Member States demonstrates that regulatory compliance drives environmental behaviour. It shows that SMEs are governed by the need to comply with, and that their actions are frequently a response to, environmental regulations. It also shows that SMEs in each member state show similar patterns of behaviour since they all tend to respond in the same manner. The authors argue that EU policy should therefore focus on helping SMEs comply with environmental regulations and that support mechanisms need to address the compliance needs of European SMEs.

INTRODUCTION

With funding from the European Commission's Leonardo da Vinci programme, four Universities in different member states – UK, Ireland, Czech Republic and Greece – carried out a study to determine the environmental support needs of SMEs. The aim of the project was to find out what influenced the behaviour of SMEs, and to discover their learning and support needs. This work would enable the partners to develop a learning support package that was based on actual need and that would help SMEs to improve their environmental performance. An overview of SME learning needs and a description of the learning support package (EnviroHelp) is presented in a separate paper (Williamson and Lynch-Wood, 2005).

An SME is defined by the European Commission (2003) as a firm with fewer than 250 employees and which has either a turnover of less than €50m or a balance sheet total of less than €43m. Liikanen (2000) reported that there were almost 18 million SMEs in Europe, though this will have increased following the accession of 10 member states in 2004. The European Commission (2003a) recognises the importance of SMEs for national economies. For example, 66% of the EU workforce is employed in SMEs. This is higher than both the United States (42%) and Japan (33%). SMEs also account for 60% of the EU's gross domestic product and are a major source of wealth creation and innovation (Arias-Aranda *et al*, 2001; PIU/SBS, 2001).

While the aggregate economic impact of SMEs is positive, there is little evidence of their environmental impact or of the environmental damage that they cause (KPMG 1997; Petts 2000). The Marshall Report (1998) estimated that SMEs accounted for 60% of total carbon dioxide emissions from business in the UK and that there was substantial room for improvement in energy efficiency and emissions reductions. It has been estimated that SMEs account for 70% of all pollution (Hillary 1995; KPMG, 1997; Groundwork, 1998). They are also reported to be responsible for 60 per cent of commercial waste (Netregs, 2002) and 80% of pollution incidents (Environment Agency 2003). In the Netherlands, SMEs account for 36% of all CFC emissions and 24% of all waste (Hoevengel and Wolters, 2000). The environmental impact of SMEs is cumulative, with many small activities producing a significant environmental impact (Hillary, 1995, 2000; Welford, 1994; Schaper, 2002; Gunnigham 2002; Petts 2000). Gunningham (2002) also argues that SMEs have a greater environmental impact per unit than larger firms.

METHODOLOGY

The lack of empirical work on SMEs, particularly work which compares SME practices in different EU states, required an approach that captured information which would enable us to understand the environmental practices of firms. It was also important that this information was sufficiently structured to allow comparisons across the four member states. Therefore, a semi-structured questionnaire was developed that could be used in each state. The questionnaire was divided into six parts (general background information, input monitoring practices, output monitoring practices, organisational commitment, regulatory issues, learning and support needs).

It contained mostly qualitative and open-ended questions, though some quantitative questions were included, mainly on background information such as company size, turnover and ownership status. Over a nine-month period the partners interviewed 66 SMEs. Table 1 shows the actual and proportionate number of SMEs selected in each state.

Table 1: No. of interviews conducted in each participating state

Partner State	No. of companies (actual)	Proportionate no. of companies (%)
Britain	20	30.3 %

Czech Republic	14	21.2%
Greece	15	22.7%
Ireland	17	25.8%
TOTAL	66	100%

The interviews were prearranged and carried out with senior personnel (e.g. directors or senior managers) so that respondents had the status, time and relevant knowledge of the subject. Interviews were recorded and subsequently transcribed. When interviews had been transcribed, quantitative data were analysed using the SPSS statistical software package while the qualitative data were analysed using N-Vivo. N-Vivo was chosen because it is versatile and user-friendly (Sinkovics *et al*, 2005), useful for relationship-building (Morse and Richards, 2002) and effective when undertaking fine-grained analysis (Gibbs, 2002).

RESULTS

General profiles
Figure 1 shows that most firms had between 11 and 250 employees. Only 11 firms were micro businesses, and the proportion of small (26) and medium-sized (29) firms was fairly evenly distributed. Overall, respondent firms from Greece and Ireland tended to have fewer employees than those from the Czech Republic and UK. There was a greater number of Greek and Irish micro-business and fewer medium-sized firms than from the Czech Republic and the UK.
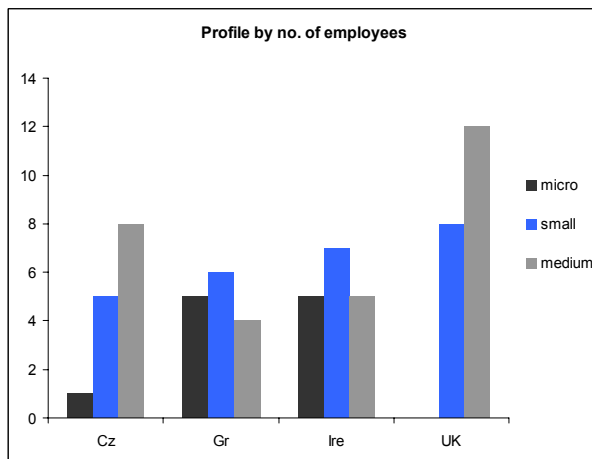

Figure 1: Profile of respondents by no. of employees

For the purpose of cultural comparisons each partner focused on a local, geographically dominant, industry. Selected SMEs from the UK and the Czech Republic were from the industrial manufacturing sector because of the relative importance of heavy manufacturing industries. Greek and Irish SMEs were drawn from the food production industry because of the significance of this sector to these local and rural economies.

Respondents were asked to specify their firms' turnovers from a list of categories. Figure 2 shows that 23 (34.8%) firms had a turnover of less than €2m, making this the largest category within the sample. Most SMEs in this category were from Ireland and Greece, suggesting that firms in the food production sector have lower turnovers. This was predictable, given that there were more micro-businesses in the Greek and Irish samples. Only 2 firms had a turnover of greater than €30m with the remainder being distributed across the €2m to €30m bands.
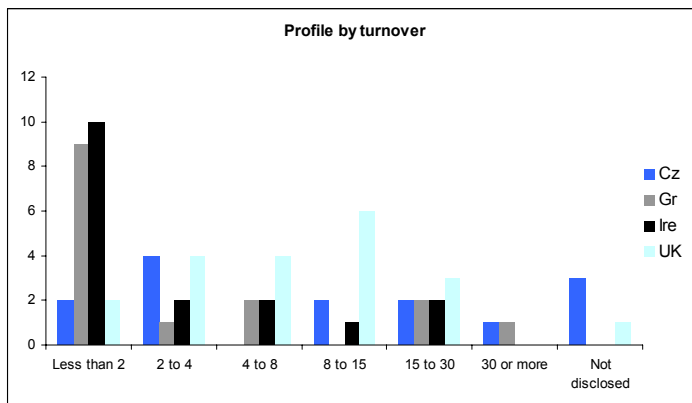
Figure 2: Profile of respondents by turnover

Environmental profiles

All respondents held senior positions, being either managers (40: 60.6%) or directors (26: 39.4%). Although all respondents had responsibility for environmental issues, only 9 (13.6%) had the word *environment* in their title (and these were all managers). Respondents in firms with fewer than 50 employees tended to be directors with extensive responsibilities, whereas those in larger SMEs were typically managers with more specific responsibilities. This suggests the environmental role is residual, particularly in smaller SMEs: a finding which supports other studies such as the examination of UK-based SMEs by Williamson and Lynch-Wood (2001).

Respondents' comments support the view that the environment is a residual function. A manager of a small Greek producer of olive oil stated that "As part of the overall operational responsibilities I'm dealing with environmental issues as well". Similarly, a manager of a medium-sized ceramic manufacturer in the UK said "I'm the Quality Manager, although I also deal with health & safety and environmental and technical matters". The comments of a manager of a medium-sized manufacturer of wiring harnesses in the UK exposed the lack of structure in SMEs when it comes to dealing with environmental matters: "Yes, I'm the environmental champion for the company. There used to be someone in charge of health and safety and environmental stuff, but not any more. They made him redundant in July. It was never clearly defined who was going to take over that role so it's landed with me".

As a defined management function, the environment seemed to have appeared relatively recently. Typically, it has been attached to existing roles in the last decade or so – a manager in the UK reported: "it's a job that's grown from nothing over the last five years". Importantly, the incorporation of the environmental function was frequently a response to specific events (e.g. environmental accidents, complaints or legislation). A Technical Services Manageress of a UK-based manufacturer of toys and gifts explained that the packaging waste directive lead to environmental issues becoming much more important to her firm. When asked how she had acquired environmental responsibilities she answered: "I just picked it up".

Respondents found it difficult to say how much time they spent on environmental issues, though common phrases include "very little", "minimal", "it's negligible" and "only what is absolutely necessary". None of the respondents spent a regular or fixed amount of time in an average week or month since they tended to deal with environmental issues when they occur. For most of their working time the vast majority of respondents gave little or no thought to environmental issues. Yet there are periods, which normally involve issues of legislative compliance, when the environment absorbed more of their time. For example, on occasions respondents had to deal with a visit from a regulator, or complete paperwork for waste disposal or emissions and discharge monitoring. Issues which take up time and which are not connected with legislation include ISO14001 inspections and customers' environmental questionnaires. Clearly, however, almost any time that respondents spend dealing with environmental matters was a reaction to specific issues (reinforcing the earlier point that the environmental function in SMEs is residual).

When asked to specify an amount of time in percentage terms, 30 (45.4%) respondents gave a figure of less than 2%, while 15 (22.7%) were unable to say. Only 13 (19.6%) respondents spent more than 5% of their time on environmental issues and these were normally managers with the word *environment* in their title. It is interesting to note that even designated Environmental Managers did not inevitably spend all of their time on environmental issues. An Environmental Manager of a medium-sized engineering company in the UK commented: "My time is anywhere between say 10% to 25% depending on workload".

Further analysis shows that directors of small companies spent less time on environmental issues than managers of larger SMEs. The comments of a Managing Director of a timber component manufacture in the UK typifies directors' responses: "I'd say very little…..less than 1% I would think. It's nothing". Generally, the lack of departmentalisation in smaller SMEs means directors have a wider portfolio of responsibilities than managers of larger firms. It is therefore not surprising that the environment is lower on Directors' agendas.

Environmental policies

Figure 3 shows that most (40: 60.6%) firms did not have an environmental policy. Twenty (30.3%) firms had a policy, while 6 (9%) were in the process of developing one: these were mainly firms working toward ISO14001. Further questioning revealed that some of the firms that have an environmental policy do not have a written one. They had vague unwritten understandings to respect the environment, as a Production Manager of a small chemical manufacturer in the Czech Republic reported: "we do have a policy. It's not written. It's to do business in respect to maximum protection of the environment. All our activities are carried out with respect to the living environment. In future our environmental policy will follow the legislation in force". Figure 4 shows that most of the 40 firms that do not have an environmental policy either do not plan to have one or are undecided.
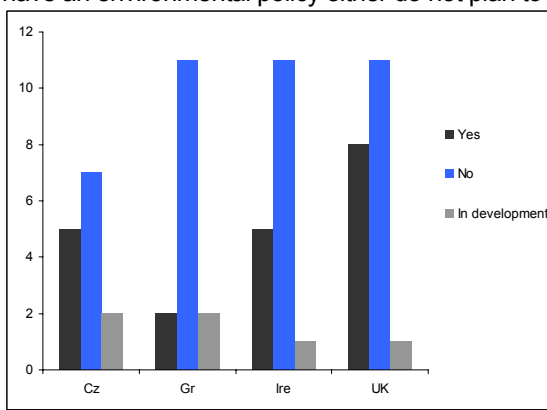

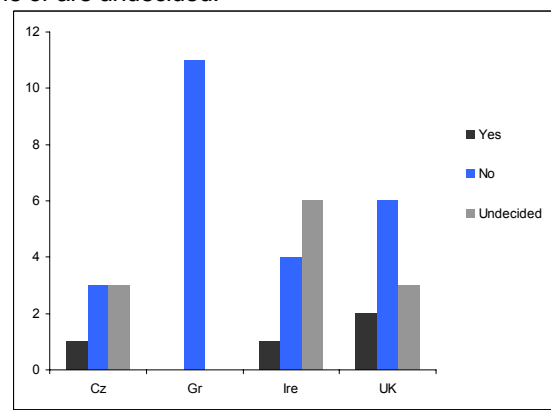**Figure 3: Do you have an environmental policy?**

Figure 4: Do you plan to have an environmental policy?

Environmental reports

Firms' attitudes to environmental reporting were similar to those to producing policies since the majority (57: 86.3%) do not product a report (Figure 5). It is noticeably that no firms in Greece produced a report, and firms in Ireland appeared less likely to produce one than those in the UK and the Czech Republic. This indicates that there are greater pressures to report in the industrial manufacturing sector. Many respondents considered it unnecessary to produce an environmental report because their firms do not pollute, as one Greek director suggests: "No, we do not do it. We do not pollute the environment a lot such as a chemical plant, so I don't think we need to report what we do". With the environment being a relatively new concern for firms, respondents had invested their time in less proactive measures, such as ensuring legislative compliance and undertaking small cost-saving initiatives. Little, if any, thought had been given to environmental reporting. For example, a manager of a firm in the UK states, "No. we've not produced a report. Probably sometime in the future we might, but we're very much in the infancy stage of being an environmentally aware company."
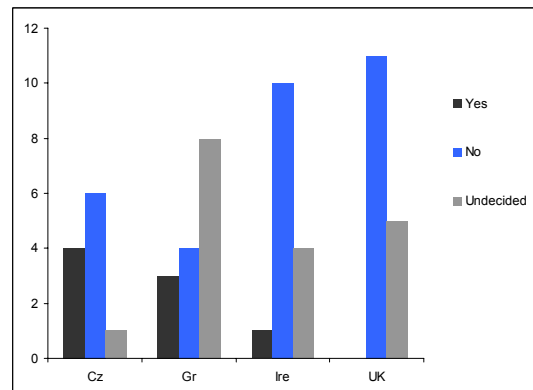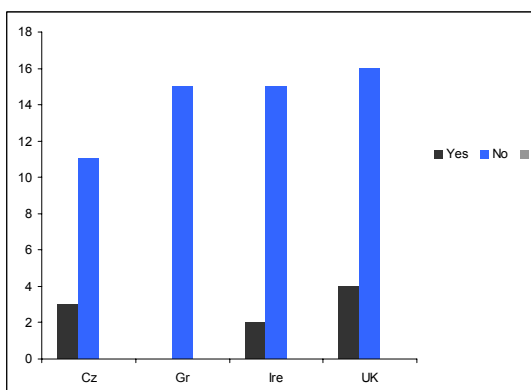
Figure 5: Do you produce an environmental report?   **Figure 6: Do you plan to produce an environmental report?**

Only nine of the 57 firms than do not produce a report were planning to do so in the future (Figure 6). Their responses, however, should be carefully interpreted. While some firms had concrete plans to produce a report, others felt that legislation would eventually force them to, as the Director of a firm in the Czech Republic commented: "we have not produced an environmental report yet, but in the future it may be necessary because of legislation".

(Environmental) management systems
Respondents were asked if their firms had an EMS, such as EMAS or ISO14001. Figure 7 shows that the majority of firms (48: 72.7%) did not have an EMS in place, confirming other studies such that undertaken by Hilary (1999). Those companies that had, or were implementing, an EMS tended to be larger SMEs.
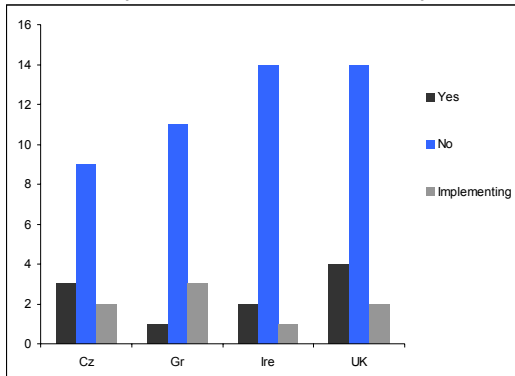

Figure 7: Firms with environmental management systems

Firms in the UK and Czech Republic were more likely to have an EMS than those in Greece or Ireland. Like environmental reporting, this suggests there are greater pressures for implementing an EMS in the industrial manufacturing sector. Respondents confirmed that their firms had faced pressure to implement an EMS from their customers, as one Director in the Czech Republic maintained: "it's important for our customers' requirements". The same respondent also reported that pressure came from public authorities: "we've also partly gone for it because of check ups by the public health inspectors".

Disappointingly, the conversation revealed that not all EMSs were accredited systems, indicating that respondents had an inflated view of how environmentally advanced their firms were. Of the 18 (27.2%) respondents that said their firms had an EMS, only 7 (10.6%) had ISO14001 while 8 (12.1%) were implementing it at the time the interview took place. None of the firms had EMAS. The remainder had developed an internal EMS, as one UK manager commented:

> "…we haven't got a documented one or an official one for the environment. But when you look at our environmental system, I could almost get away with saying come and look at my system and tell me there's nothing in my system that isn't covered by your system…….They could come and audit us for environmental accreditation and I thing we'd get through".

Environmental challenges
A study undertaken for the UK's Environment Agency concluded that SMEs "often work under the misconception that they have little or no impact on the environment" (Netregs, 2002). The study revealed that in 2002 86% of SMEs felt they have no impact, compared with 48% in 2000, 33% in 1998 and 22% in 1995. One of the innate dangers in the approach that was undertaken for this survey is that the negative connotations relating to the word *impact* could lead to responses that are influenced by social acceptability bias. Respondents who consider causing pollution to be socially *un*acceptable may be tempted to answer accordingly. The current study looked at *challenges* rather than *impacts*, since the connotations associated with of the word challenge are less negative. Interestingly, 53 (80.3%) respondents reported that their firms have at least one environmental challenge, while 13 (19.7%) said they had no challenges (and these were predominantly small firms from the Greek food processing sector). This finding suggests that respondents have a subconscious or intuitive acknowledgement of their (environment) impacts and calls into question the findings of the Netregs (2002) survey.

The most frequently cited (40: 60.6%) challenge related to waste. Respondents had concerns about handling, storage, disposal and volumes produced. In fact, the volume of waste was respondents' biggest problem, as the

Environmental Manager of a medium-sized engineering factory in the UK commented: "we generate too much, so reduction of that and its disposal – two ends of the same problem". Also, a Training and Environmental Manager of a medium-sized diary firm in Ireland stated that her biggest problem was "minimising solid waste and packaging".

Compliance with regulation was also cited as a challenge, particularly measures on waste, packaging, integrated pollution control air pollution, wastewater treatment and nitrates. For example, a Quality and Technical Manager of a medium-sized diary firm in Ireland stressed that his main challenge is "whatever IPPC licensing will bring, particularly on the reduction of phosphorus discharges", while a Quality Control Manager of a machine components manufacturer in the Czech Republic commented on the "implementation of regulations on air protection is a problem, particularly transposition of Directive 99/13/EC…you know, the one on reducing volatile organic compounds released from organic solvents" (see Box 4). An issue associated with both waste and regulation was costs. A number of respondents expressed concern that environmental initiatives impact on profits: "It all costs money", was the concise response of a Director of a small meat processor in Ireland.

Although there were few differences in the types of challenges that affected firms – they consistently related to waste, regulation and costs – there were approximate disparities across sectors and states. The challenges faced by food processors, particularly those in Ireland, tended to involve technical matters associated with legislative compliance, while those faced by UK and Czech firms were usually more general, relating to production issues, waste and costs. Such discrepancies are purely anecdotal.

SME environmental practices

This section reviews environmental practices. It considers the extent to which firms monitor their material inputs and outputs. It also reports on whether firms undertake environmental audits, assessments or initiatives.

Respondents were asked to comment on the firms' monitoring practices since it was felt that a resource efficient firm would monitor closely its material and energy inputs and waste and product outputs. Contrastingly, it was believed that a wasteful firm would have casual monitoring practices. Figure 8 shows that monitoring practices are rather unsystematic. Raw material inputs are monitored by most (41: 62.1%) firms – though a surprisingly high percentage (25: 37.8%) do not – and firms in the UK are more likely to monitor their raw materials than firms in other states, which is possibly explained by the high cost of raw materials in the UK.
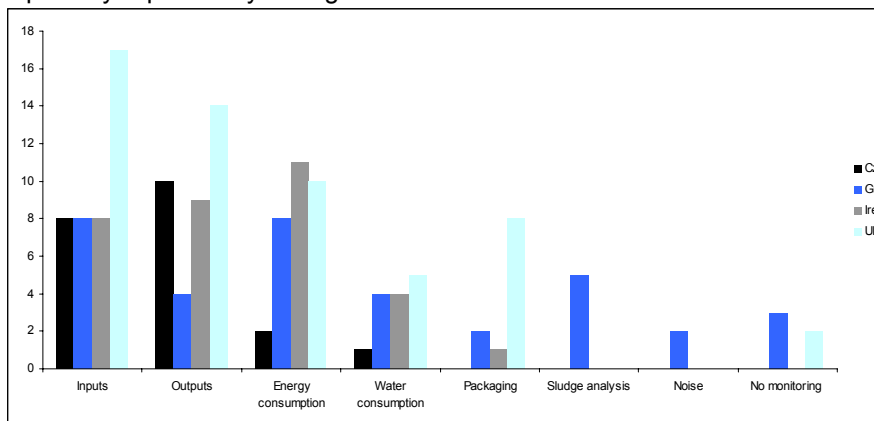

Figure 8: SME monitoring practices

Further discussion revealed that not all firms adopt the same monitoring practices. Some firms have stringent monitoring practices, with regular stock checks and booking in systems. Others use their knowledge, experience and visual aptitude (i.e. they know when stocks are low). There was very little monitoring of other items such as ancillary materials – items, such as solvents, that may go indirectly into the production process – packaging or consumables. Naturally, the items that are not monitored are usually less costly and are therefore not believed to be critical to the success or failure of the business. They are also not monitored because respondents lack time and resources, as one manager in Ireland suggested: "Monitoring can take time with little financial return." Energy inputs are monitored by almost half (31: 46.9%) of the sample of firms, though further inquiry revealed that energy is usually monitored casually. Respondents who monitor their energy often do so globally, through observing their energy bills. Few firms (have the capability to) monitor individual pieces of equipment or machinery, as a manager of a ceramic tile manufacturer UK explained: "We do it globally, just through checking the bills. There's no way we could tell you if a

piece of machinery is efficient or not. I suppose it's a bit of a problem really".   Material and waste outputs are monitored by 37 (56%) firms, with those in the UK being most likely monitor their outputs and those in Greece the least likely. Respondents were then asked why they monitored their inputs and outputs. It became evident that monitoring is undertaken for two reasons: business performance/efficiency and regulation. Disappointingly, there was virtually no monitoring purely for environmental reasons).   Figure 9 shows that most (40: 60.6%) firms monitor their activities because they want to reduce costs and to be more resource efficient ("the business performance rationale"). This was obvious from the comments of a Materials Manager of a medium-sized ceramic manufacturer in the UK: "we do it to reduce costs…..if there are any ways to reduce the cost of materials being used; using up stock that we've got in…..Whatever we can save".

Since they tend to be large cost items, raw material inputs are nearly always monitored for business performance reasons, as one UK manager confirmed: "It's monitored so it can be compared against budget and therefore, you can forecast what the gross profit margin will be within the company."   As shown above, there was little monitoring of ancillary materials, packaging or consumables. This is because they tended to be lower costs items which were not so critical to firms' business performance and efficiency. Regulation is the second most (31: 47%) important factor behind firms' monitoring practices. A Director of a medium sized painter sprayers in the UK claimed that he monitors because he has to: "I think truthfully you've got to look at legislation haven't you.   You've got to stay within the legislation….That's your key driver. It's got to be. I'd love to sit here and say……..we need to look at it and see if we as a company can do our bit towards the global thing. The reality is we have to stay within legislation, and that is a true reason isn't it, you know".
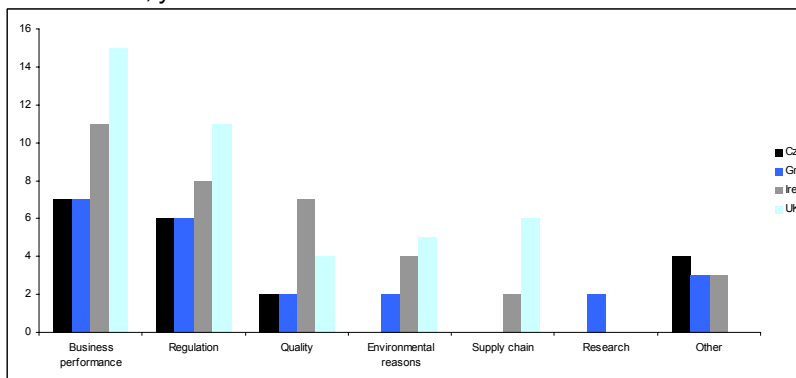
Figure 9: Reasons for monitoring

Further probing revealed the different items tended to be monitored for different reasons. While inputs, especially expensive raw materials, were more likely to be monitored for business performance reasons, outputs were normally monitored because of regulation ("the regulatory rationale"). As expected, firms with a permit, license or discharge consent monitored those items that were covered by the prior approval instrument exclusively for regulatory reasons. For example, a Quality and Environmental Systems Manager of a medium-sized paper converting company in the UK commented that "Obviously we monitor effluents because of our discharge consent". It soon became apparent this firm probably would not have monitored these pollution outputs had it not been for regulatory pressure – he continued: "We do spot monitoring to ensure we are meeting our consent in terms of COD, suspended solids and pH etc. but we don't do any volume monitoring. It was one of the things I wanted to bring in but as [the Water Company] weren't interested the Board aren't, so it's very difficult to know what is going down in terms of volumes". Similarly, an Environmental Manager of a UK-based medium-sized engineering company with an air pollution licence commented that "emissions to air we do a daily assessment and we do a yearly monitoring of the stacks so we can actually see what's going out. [**Q: Because of the licence?**]. Yes, because of the regulations" Output monitoring in the Greek and Irish food firms was clearly undertaken because of the regulatory rationale. For example, a Quality Manager of a medium-sized producer of meat products in Ireland listed the items that he monitored, using standard analytical methods, for compliance with his firm's permit (wastewater: nitrogen, phosphorus, suspended solids, BOD, COD, Ammonia, Nitrates, Chlorine). In Greece, an Environmental Manager of a medium-sized producer of ouzo explained that his firm's wastewater effluents were monitored for regulatory reasons: "Well, legislation. Wastewater effluents are regulated by the municipal wastewater treatment plant specifications". He explained that his other main pressure was "costs and efficiency, meaning to be able to reduce production losses. We monitor the production efficiency….Maybe later in the future the ISO 14001 and 9000 will require us to monitor much more in detail". Other than where there are regulatory pressures, there is little monitoring of outputs. Yet manufacturing firms in the UK and Czech Republic occasionally mentioned their product outputs (reworks and rejects), as one Managing Director of a small aluminium

frame manufacturers commented:

> "We monitor rejects; that's probably the only one we have a system in place for. We do that twice a year. [**Q: What about rework?**]. I'm trying to find a way of measuring it. We do have an element of it but we've never measured it before. The best way would probably be time, and that is the main driver, there will be material, there are some material elements in rework but the prime driver from our point of view is that of the time taken in the production process to rework something through the system. We are conscious of rework and I can tell you when it's high and I can tell you when it's low but I couldn't quantify it like we can now with rejects. We've set up a system, an errors log, but since we set it up we haven't been working at capacity and I'm not sure we've logged any errors yet"

Environmental audits, assessments and initiatives
Respondents were asked if their firms had undertaken an environmental audit or conducted an assessment of their environmental performance. They were also asked to comment on whether their firms had undertaken any environmental initiatives (e.g. process or design changes).

Only 10 (15%) firms had undertaken an environmental audit (Figure 10) and they tended to be those that had environmental policies and published reports. An environmental audit, however, was defined broadly, suggesting that the breadth and depth of auditing differs among the SME sector, especially in terms of how they are conducted, and by whom. Some audits had been conducted by external agencies. Other firms were less formal in their approach to auditing, since they were conducted internally by employees. This somewhat fragment picture is compounded because most firms had no plans to conduct an environmental audit in the future (Figure 11).
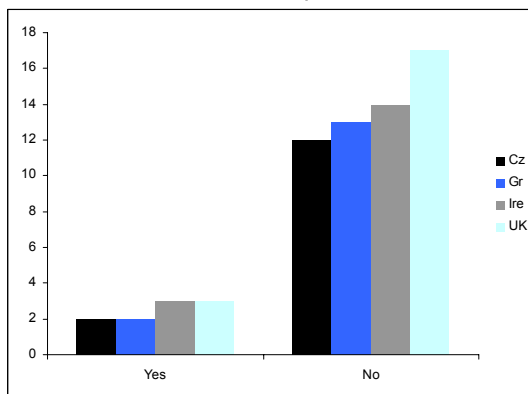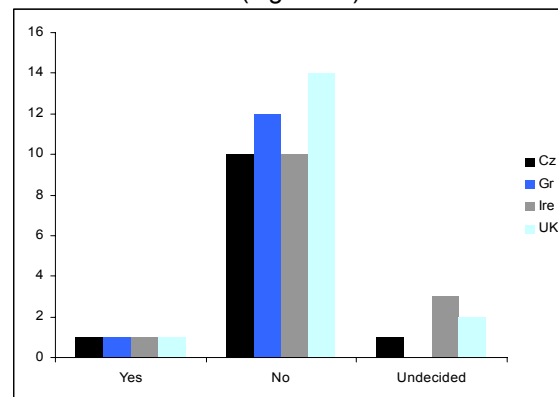

Figure 10: Environmental audits

Figure 11: In the future

Similar to those responses on environmental policies and reporting, it was clear that firms would only conduct an environmental audit if they were forced to do so. Respondents also felt that extra skills and resource would be needed if firms were to properly audit their activities. A Managing Director of small aluminium frame manufacturers in the UK provided an informative viewpoint on auditing: "…I think the only way we would move forward with an audit is by getting an external body in to do it and if we had to; it's lack of resources……..If the pressure was there to do it we would find a way of doing it and that would undoubtedly be using a consultant to come and do it. But as I say, the pressure just isn't there yet…"

More encouragingly, 23 (34.8%) respondents reported that their firms had undertaken some type of assessment of their environmental performance. Yet there were virtually no examples formal assessments undertaken rigorously by external agents. Assessments were conducted internally and could be described as internal management directives, as one manager of a firm in the Czech Republic commented: "In the second month of each year our environmental performance is assessed by all the management members." Most assessments were vague and informal, as the comments of a Production Manager of a ceramic manufacturer in the UK demonstrate: "[person's name] does….unfortunately he's just tied up at the moment. He does…..he does the assessment of the cardboard waste, he keeps his eye on the skip, the same as I do – he's only got a small responsibility about environmental issues but they are the only sort of assessments that you do, the informal ones."   Furthermore, assessments were usually undertaken reactively and for one-off issues, tending to lacking lack structure and substance. They rarely entailed a comprehensive and holistic appraisal of firms' total environmental performance, as was clear from the comments of a Quality and Technical Manager of a medium-sized dairy firm in Ireland: "Yes, we've done some assessment on effluent, but not on any other areas".

A reasonable number of respondents (23: 34.8%) reported that their firms had undertaken some type of initiative to improve their environmental performance. Again, there was little evidence of tangible outcomes as responses tended to lack substance – as a Manager of a medium-sized wine producer in Greece commented: "we try to improve our performance in both the technical level and the managerial one. There is always room for improvement…..". Unfortunately, he was unable to give details of the initiatives the firm had undertaken. Respondents normally described general business innovations rather than environmental innovations, as the comments of the Managing Director of a small aluminium frame manufacture in the UK suggest: "there are ways we've made improvements in managing waste and improving efficiencies is the prime way we've done that. When we networked the building it resulted in a significant saving of paper". This is supported because firms would not embark on environmental initiatives if they brought about and increase in production costs: clearly, firms needed to see efficiency gains rather than environmental benefits *per se*. A Director of a UK engineering firm commented that he had "looked at buying green energy" but that unfortunately he could "only find one person who could supply us enough and they were far too expensive". He added: We're always looking, but it's cost-driven. We have to produce a good product within a price". Similarly, a Proprietor of a small Oatmeal Mill in Ireland also commented: "we've selected cardboard boxes that can fit more product which results in less packaging per and save money".

Like assessments, environmental initiatives seemed to be undertaken for – or a response to – one-off matters. The reactive nature of SME environmental practices means that initiatives are not the product of an organisational strategy for enhancing environmental performance (although one firm in the Czech Republic improved its process design by installing painting and degreasing equipment to reduce VOCs – a response to regulation!). Rather, they tend to be random, knee-jerk and conventional. For example, the Director of a medium-sized dairy firm in Ireland stated that there "are facilities for plastic and paper bailing for recycling, but there's been no training on this, so progress isn't great". There were some incidences of waste separation and of the use of bailing machines, yet these measures tended to operate at the margins of organisational activities. Even a Quality and Environmental Systems Manager of a UK-based ISO14001 registered firm did consider his organisation to be effective when developing and implementing environmental initiatives. When asked if his firm was (environmentally) innovative he replied: "Not very, to be perfectly honest. ….The only way we would be innovative is through what we use, our product line...new products ……. We haven't done anything that I would call very specialised to be honest". An Environmental Manager of a medium-sized ISO14001 engineering firm in the UK commented that: "We haven't been particularly successful. We've done things in the past like the sand savers and that reorganise the way we cast - put two items in the same sand box; but anything really innovative? Probably not!".

Only 8 (12.1%) firms had worked with suppliers to find solution for environmental problems, to improve their performance or to enhance their products. Most, successful, collaborations related to packaging issues, as the Director of a small meat processor in Ireland commented: "Yes, incoming raw material [pork meat] is now delivered in returnable trays; this has reduced the amount of packaging waste. We've reduced cardboard waste to one twentieth of the volume through this initiative". There were occasions when attempts to collaborate with suppliers had been unsuccessful. Ironically, it was packaging which that caused the partnership to breakdown – as a Marketing, Quality and Transport Manager of a small dairy company in Ireland explained: "We have attempted to work with….or put pressure on our suppliers…you know, on returning packaging…. We haven't had much success though". He alluded to the difficulties of influencing suppliers' practices, especially when suppliers are large and possess monopolistic characteristics: "Tetrapak has near total monopoly on carton packaging". A Managing Director of a small supplier of organic beef and lamb in Ireland had "searched extensively for alternatives to current plastic packaging", but had "not succeeded in identifying material that will meet food safety and quality criteria". The vast majority of firms do not work with suppliers to identify and implement environmental improvement measures. When firms do attempt to work with suppliers, suppliers do not necessarily assist. Moreover, none of the respondents reported that their firms considered environmental factors when making purchasing decisions.

Drivers of performance
A number of studies have looked at what influences SME environmental behaviour. For example, according to Gintersdorfer (2003) there are four key influences: namely, owner/manager values, supply chain, cost savings and potential to attract customers. Tanner *et al* (1996) demonstrates that firms monitor their waste outputs for efficiency and legal reasons, while Appiah-Adu and Singh (1998) reveal a positive and significant link between customer orientation and SME performance. Management values and commitment have also been shown to be important driver (Petts *et al*, 1998; Nutek, 2003), as have regulations (Charlesworth 1998, Petts *et al*, 1999, Netregs, 2002).

This current study reveals that most respondents felt that regulation was the most important influence upon their firms' environmental behaviour: that their firms are motivated merely by compliance (Figure 12). This was the same for

respondents in each member state. For example, a manager of a small Greek olive oil producer commented: "Law. This is important for us. You can't work without respecting environmental regulation". Likewise, a Director of a small engineering firm in the UK stated "Well, I think truthfully you've got to look at legislation haven't you? You've got to stay within legislation. We're here to make a profit, so we would do anything if we didn't have to". This supports other findings in the study where it was demonstrated that regulation was an important driver of (output) monitoring practices, and that firms will not produce environmental policies, publish reports or implement EMSs unless they required to do so.

Regulation was closely followed by costs and efficiency (45: 68.1%) and then supply chain pressures (32: 48.4%), while only 14 (21.2%) firms identify personal values as an important driver of environmental performance within SMEs. Interestingly, when asked about the personal values of management and its influence on environmental practices, 55 (83.3%) respondents said there was a positive link, as a Director of a medium sized dairy company in Ireland commented: "Yes, I'd consider myself environmentally friendly at home and I'd wish to see Society do likewise". Yet there was no evidence of environmental practices being improved as a result of the personal values of management. Encouragingly, 33 (50%) respondents reported that their firms involve employees in decision-making about environmental issues, though only 9 (13.6%) reported that they listened to their employees. Final decisions rested with management. Many respondents talked of a convergence of pressures from multiple sources, as the manager of an engineering firm in the Czech Republic stated: "The decisions are made in keeping with the legislation and in relation to the company's business performance".
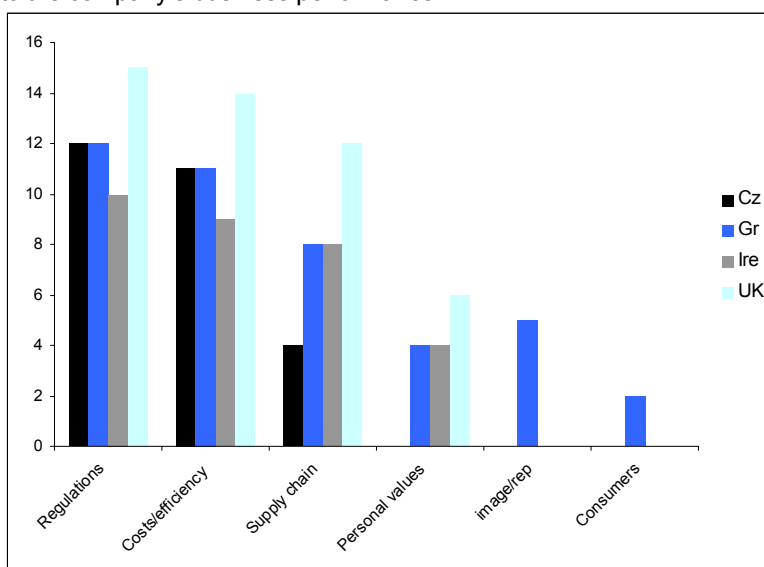

Figure 12 drivers of performance

The impact of regulation
Here, respondents were asked a number of questions relating to environmental regulations. The main findings were:

- Most (59: 89.3%) respondents admitted that they felt pressure from environmental regulations
- Most firms (39: 68%) reported that waste regulations were the biggest source of pressure, while regulation of air emissions and packaging were also mentioned by 16 (24.2%) and 15 (22.7%) respondents respectively.
- Most (44: 66.6%) firms admitted having taken some steps since the introduction of regulations.
- A large proportion (32: 48.5%) of respondents felt that environmental regulations were necessary and important.

Firms were asked to specify if they required a permit, licence or consent. Table 7 shows that most of the food processing firms require at least one type of permit – the most common permit for firms in Ireland was the effluent discharge consent, while Greek firms talked of an "operating permit" covering all regulations. In the UK, there were 2 firms with an integrated pollution control licence, 2 with a local authority air pollution control license and 2 with a water discharge consent. In the Czech Republic, permits and requirements were varied, ranging from permits to handle hazardous waste materials, permits to treat chemicals, permit for surface water abstraction and for waste water discharge. When respondents were asked if they would need a new (or different) permit in the future, most did not

know. Some respondents thought there would be no change to their permits requirements for some time, though 2 firms in the Czech Republic suggested that they expected a change to their national framework because of EU accession.

Table 7: Permits and licence requirements

	Britain	Czech Republic	Greece	Ireland	**TOTAL**
Yes	6 (30%)	9 (64%)	13 (87%)	13 (76%)	41 (62.1%)
No	14 (70%)	5 (36%)	2 (13%)	4 (24%)	25 (37.9%)
TOTAL	**20 (100%)**	**14 (100%)**	**15 (100%)**	**(17 (100%)**	**66 (100%)**

Most firms did not proactively seek new information on environmental regulation, as they tended to react to information if, as and when they received it. As one Manager of an engineering firm in the UK stated: "I am sure if there is something coming out we will have a brochure through the post or whatever. But until it gets pushed the letterbox, there's nothing we can do… It is difficult, because there's that much that it seems to be thrown at you at the moment." This is an important finding, and is aggravated by the reported lack of targeted information on regulations.

Although they reacted to information on environmental regulations, most (44: 66.6%) firms reported having undertaken measures following the introduction of regulations (see Table 8).

Table 8: Measures following environmental regulations

	Britain	Czech Republic	Greece	Ireland	**TOTAL**
Yes	14	9	8	13	**44**
No	6	5	7	4	**22**
TOTAL	**17**	**13**	**15**	**12**	**66**

Further discussion revealed that regulations had various impacts, though firms tended to construe measures as being synonymous with mere compliance - as a Director of a Greek wine producer stated: "We have operational permits for all production facilities that satisfy legal requirements in terms of wastewater, air emissions and solid waste etc". Similarly, a Plant Director of a Greek producer of chewing gum commented: "We fully comply with the legal requirements". In the Czech Republic, a Quality Control Engineer of an industrial design and manufacturer of forming machines and tools commented that "we deal with waste records and reports in compliance with legislation", and in the UK a Quality Manager of a medium sized ceramic manufacturer said that "I have to specify what's in my waste and all that, which is required by the law". A Production Manager of a Chemical Manufacturer in the UK explained the steps that his firm had taken as a result of their IPPC application "we've had to do ground surveys, emissions modelling and this, that and the other, I don't think it'll force us to do anything other than what we're doing now. It'll just cost us money. It's a knock on the bottom line, another cost…" A similar theme emerged in Ireland, as one Technical Manageress of a medium-sized dairy company stated, "We've become members of Repak….the approved packaging compliance scheme", and a Director of a small meat processor stated "we've had to apply for an effluent discharge permit from the local authority". This supports the finding of a study by Baylis *et al* (1998) who suggested that compliance with regulations is the most common source of environmental motivation for firms of all sizes.

As revealed above, regulation seemed to facilitate better monitoring practices (most notably where firms have a licence to emit to air to the discharge into water). Firms needed to ensure that they were compliant with relevant standards or conditions, as the manager of a medium-sized firm in the UK stated, "We're subject to stricter controls – we've started to monitor and we're better at it". A Production Manager of a Chemical Manufacturer in the UK, which used large amounts of energy, stated:

> "We've started to monitor much more closely our energy usage which is quite intensive. We've looked at the black room (?) where we had gas burners running all night long and we've temperature monitoring and what-have-you…We'll start monitoring everything eventually….which will give me a lot more…we're going to put more control in"

A Training and Environmental Manager of a medium-sized dairy company in Ireland stated: "we've set up a monthly monitoring of shipments. We monitor cardboard and plastics recycling". There was also some evidence of capital

equipment being purchased and structural changes being undertaken, as an Economist for a small olive oil producer in Greece stated, "we've installed a wastewater treatment facility that includes a sedimentation tank. This is all we have done, really". Also, a Quality Manager of an Irish producer of pork and pork products stated, "we've constructed a new wastewater plant on this site." Other measures that were undertaken by firms as a result of environmental regulations included ISO14001 accreditation, noise surveys and training.

When firms asked to comment on their general perceptions of environmental regulations, it is interesting that 32 (48.5%) respondents felt that they were necessary and important: that they protected the environment and improved peoples' quality of life. The remainder felt that they were 'something that they had to deal with' or had no real opinion on the matter. For example, a Manager of a producer of organic marmalades in Greece stated that "It is absolutely necessary for the protection of the environment. The average businesses wouldn't do much if it wasn't obligatory to respond." A Quality Control and R&D Director of a medium sized producer of confectionery products in Greece said "It is necessary to preserve the environment but to smaller companies it is more difficult to comply".

Respondents in all states felt that legislation was difficult to understand, complicated and unclear. It was therefore difficult for respondents to be sure whether they were complying with their legal obligations – as a Manager of a machine tooling company in the Czech Republic stated: "The legislation is unclear, complex and continuously amended…there are too many controlling bodies." Similarly, a manager of a small machine tooling firm in the UK also stated that "There's just too much regulation and all that. It's difficult to find and it's difficult to read when you find it. It keeps lawyers in well-paid jobs though". On enforcement, 33 (50%) respondents felt that the regulations were strictly enforced, though, not surprisingly, levels of enforcement depended on the industry. Firms with regulated processes were more likely to see the regulators on a regular basis. A Quality and Technical Manager of a medium-sized dairy company in Ireland confirmed that he was visited "frequently" by the County Council, "4 or 5 times each year" by the Environmental Protection Agency, and "monitored regularly" by the Regional Fisheries Board. It is important to note that many firms felt that enforcement was a key aspect of compliance. Interestingly, 45% of firms felt that either the regulations were not strongly enforced, that there was no enforcement at all or that the policy makers and regulators did not collaborate with the business community, as one general manager of a medium-sized fish producer in Greece commented: "it's required….It's also my impression that law makers don't collaborate with the business community in all cases".

Conclusions and recommendations

The study shows that SMEs in each member state respond to environmental issues in the same way. Moreover, it demonstrates that SMEs are driven by the need to comply with regulations, but that they find these regulations difficult to follow and understand. In many cases, they are not actually aware of the regulations. . This is not surprising, given that for "many enterprises the 80,000 page body of European legislation represents the source of a huge set of burdens" (Federation of Small Businesses, 2004). If, therefore, approximately 80% of national legislation derives from EU directives and regulations, then this presents an argument that EU policy should focus on helping SMEs to comply. What is needed is a support mechanism that operates on a European-wide basis that is designed to address the compliance needs of European SMEs.

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