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Decoding Human Intervention: Pathways to Successful Environmental Management

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1. INTRODUCTION

There are over 300,000 ISO 14001 certified organisations globally, of which one third are from EU-28 (database.eco-innovation.eu). This figure shows a strong commitment in embedding sustainability into corporate strategy and operations but the UN Global Compact and Accenture study (Accenture 2016) reports that executives still see significant challenges in bringing about the changes for sustainability. Despite a preponderance of systems and analytical tools in the environmental management literature (e.g. Berry and Rondinelli, 1998; Oglethorpe and Heron, 2010; Comoglio and Botta, 2012) many organisations have not been able to achieve desirable environmental performance (Ammenberg et al., 2012; De Giovanni, 2012; Zhu et al., 2012). Human factors thought to be crucial for implementing environmental management (Chinander, 2000; Cantor et al., 2012) have merited less attention and are thus less understood. Fundamentally we still lack knowledge about the best ways to engage people and organisations in sustainable practices.

Furthermore, understanding human factors is crucial from a change management perspective (Ronnenberg et al., 2011). One of the many unanswered questions in the literature concerns the ways management intervenes or engages with employees (Ronnenberg et al., 2011; Gattiker and Carter, 2012) to implement environmental policies effectively. The need to motivate employees to participate in environmental initiatives has long been identified (Fudge, 1999). At present the literature has identified some soft key success factors (KSFs) such as employee involvement and awareness (Guerci et al., 2016, Chinander, 2001), training (Sarkis et al., 2010; Daily et al., 2012), communication (Woo et al., 2016) supervisory and management support (Daily and Huang, 2001; Cantor et al., 2012), employee responsibility (Ramus and Steger, 2000) and rewards and recognition (Rothenberg, 2003; Cantor et al., 2012). It is also thought that supervisory moral value (Jiang et al., 2011) and leadership corporate value (Bansal and Roth, 2000) are the main stimuli for the above KSFs.

However, having a list of soft KSFs is inadequate and most past studies on KSFs are conceptual in nature (Daily and Huang, 2001; Govindarajulu and Daily, 2004; Jabbour and Santos, 2008). The empirical work of Cantor et al. (2012) shows that employee affective commitment to environmental behaviour created by perceived organizational support does not necessarily lead to desirable employee behaviour. This shortcoming exists due to the tendency to consider all soft KSFs as equal and a single category of human factors. Instead, some of

these KSFs can act as drivers and conditions while others are actions that create positive employee behaviours. Managers require empirically supported insights about how exactly soft KSFs affect each other and environmental practice. Such path dependencies remain a black box today, but the black box may be revealed when the path-dependent relationships amongst these variables are understood.

Conscious that companies may achieve the same goal with different pathways, we intend nonetheless to contribute to this discussion. Hence, this paper aims to answer the following questions "*What are the roles of different soft key success factors and how do they interact to enhance environmental practices?*" Through case studies of seven ISO 14001 certified UK manufacturers, we decode the roles of soft KSFs and develop theoretical propositions to explain how each KSF functions individually and how they work together to effectively improve environmental practices.

2. LITERATURE REVIEW

Eurostat Statistics show that EU-28 generated 2 503 million tonnes of waste in 2014, and such waste are largely generated by construction, manufacturing, waste management and other human activities; and, even though EU-28 generated 22% less greenhouse gas emissions in 2015 compared to the baseline (http://ec.europea/eu/Eurostat/), it is still difficult for suppliers from other parts of the world, which form the larger part of European supply chains, to help slow down global warming. Benefits of adopting green practices include reduced energy and natural resource consumption, decreased pollutant emissions, improved financial benefits, and greater responsiveness to social expectations for the environment (Murphy et al. 2006; Zhu et al. 2007; Wong et al., 2017). Thus, it appears that more organisations are becoming proactive in applying preventative actions which can help to increase both corporate image and company market value (Goldsby and Stank 2000; del Río González 2005).

Environmental management standards (EMS), such as ISO 14001, could provide a platform for a proactive environmental strategy. Out of over 300,000 ISO 14001 certified organisations, one third are from EU-28 (database.eco-innovation.eu). In measuring the value of ISO 14001 some research (Potoski and Prakash, 2005; Yin and Schmeidler, 2008) is focused on 'hard' or directly measurable reductions in pollutant emissions and discharges, waste generation or natural resource use. Though positive performance effects of ISO 14001 or environmental management certification have been reported (Klassen and Whybark, 1999; King and Lenox

2002), other evidence show that it could not improve environmental performance (Ammenberg and Hjelm, 2002), and it could even lead to poorer lead-time performance (Melnyk et al., 2003). Such research, based on hard measurements of environmental performance, does not adequately explain why mixed outcomes are achieved.

Other research has found that improvements defined as of 'soft' factors of management have also unexpectedly occurred during the implementation or maintenance of an ISO 14001 system. Balzarova and Castka`s (2008) two case study organisations demonstrated that through the involvement of communication and participation in ISO 14001 people outside of the EMS team could contribute to the improvement of the system. This in turn increased the level of its acceptance. Case study research that ISO 14001 increased rigour in environmental programmes but most of the improvements were administrative or technical (Boiral (2006).

It appears, therefore, that efficient pollution prevention requires substantial employee commitment, along with well-developed skills and capabilities in continuous improvement and total quality management systems (Hart and Milstein, 2003). Consequently, some specific human-related key success factors (KSFs) have already been identified as essential for improving environmental management (Daily et al, 2003; Govindarajulu and Daily, 2004; Wee and Quazi, 2005; Jabbour and Santos, 2008; Guerci et al., 2016;) and achieving green supply chain management success (Ronnenberg et al., 2011; Cantor et al., 2012; Woo et al., 2016). Despite some factor grouping variations they fall into six main categories: management support, training, communication, rewards and recognition, employee responsibility, and employee involvement.

Management support has been frequently highlighted by the studies of successful environmental management (Wee and Quazi, 2005). Since it is the management that will influence the organisation's emotional and cultural resources, sharing of the values and commitments by them is crucial (Ferndandez et al., 2003; Govindarajulu and Daily, 2004). It stimulates behaviour which is rewarded when an opportunity is sought out as opposed to seeking a problem aversion strategy (Sharma, 2000). It is widely recognized that managers must be seen to be actively committed instead of providing only lip-service to environmental policies. When investigating psychological antecedents to how socially responsible behaviour arises in organisations Crilly et al., (2008) discovered that self-transcendence values and positive affect increase the propensity to engage, as do moral and reputation-based reasoning styles. As Wilms et al. (1994: p108) stated, "People will follow management's direction…whatever management does, and what direction they push and how hard they push

dictates where this company eventually goes". Less specific in the literature is the interaction between appropriate management support and the other KSFs.

Environmental training is arguably the most important element of a company's compliance strategy (Cook and Seith, 1993). It enhances employees' awareness for the need for environmental control and increases employees' abilities to adapt to change and develop proactive attitudes toward environmental issues (Wee and Quazi, 2005; Wong, 1998). It encourages environmental innovations (Wehrmeyer, 1996) and reconciliation of gaps between targets or standards and actual levels of work performance (Armstrong, 1991). In addition to creating awareness (Wong, 1998), environmental training provides motivation to participate in proactive environmental management (Cook and Seith, 1993) and build an environmentally conscious culture (Daily and Huang, 2001). However, organizations often overlook the need to assess whether environmental training produces the desired knowledge and change in attitude (Perron et al., 2006).

Environmental communication helps to provide strategic direction, create awareness and encourage employees' participation (Rothenberg, 2003; Morrow and Rondinelli, 2002). Environmental communication implies a participative environmental management style including a democratic, non-hierarchical approach to encourage communication from employees (Ramus, 2002). Kitazawa and Sarkis (2000) stress the importance of open communication which, when combined with cross-functional integration, can ensure efficient and effective use of organizational resources. This means that there should be a constant flow of information between management and the workforce (Daily and Huang, 2001). De Oliveira and Pinheiro (2009) suggest that intensive investment should be made to combine internal communication with a mechanism to disseminate environmental knowledge throughout the company with constant updating, integration and availability of key information. However, the lack of know-how in implementing open communication remains a problem. Despite recognizing the significance of feedback on individual and organizational performance, many environmental programmes fail to work (Chinander, 2001).

Employee recognition has an important role in triggering action. However, the effectiveness of financial incentives such as bonuses is still being debated. Denton's (1999) study revealed that financial incentives were rarely tied to environmental performance. Contrastingly others suggest that reward systems can motivate and reinforce employees to be environmentally

responsible (Laabs 1992; Patton and Daley 1998). Lawler (1994) suggests rewards should also be tied to performance in a way that is understood and deemed fair by the employee. Extrinsic rewards are a valuation of aspects which are external to the task itself; they include salary, benefits and job security (Kalleberg, 1977). Deci and Ryan (1985) argue that extrinsic rewards detract from the self-determination of employees and therefore reduce their feeling of self-worth. How these rewards are to be made and whether they are appropriate in environmental programmes remains undecided.

Chinander (2001) suggests that the key to employee responsibility is to create and maintain a consistent perception between what management believes they are holding subordinates accountable for and what the subordinates believe they are accountable for. Hanna et al., (2000) point out that the operations management function is responsible for the decisions involved in running and improving the processes that generate polluting by-products. Improving these processes is an on-going responsibility of operations personnel, though they have not historically been held responsible for improving environmental practice. However, the link between this responsibility and eventual desired outcomes remains unclear.

Employee involvement is regarded as a critical component of management research and organizational effectiveness (Grawitch et al., 2009). When information and knowledge are concentrated at the top levels, traditional control-oriented management exists; when they are moved downward, some form of participative management is being practiced. Other scholars have noted that employees have to feel involved in decision-making that affects their work (Conger and Kanungo, 1988; Kanter, 1983), thus reflecting why involvement is considered important. Workers can contribute more effectively when management moves the decision power down to the employees, allowing them the freedom and power to make suggestions and implement good environmental practices (Wever and Vorhauer, 1993). Other authors believe that top management should create a culture which gives its employees the freedom to make environmental improvement without excessive management intervention (Daily and Huang 2001; Daily et al., 2007; Kitazawa and Sarkis, 2000). This suggestion that all members of an organization should be freely involved in achieving environmental goals requires more empirical investigations to fully appreciate its implications.

Though there are many existing studies, we found limited works which empirically examine the roles of multiple KSFs (for exceptions see Cantor et al., 2012). Few studies have explained

environmental practices from an employee intervention perspective. Most of the work focusing on environmental policy and practice centres on the activities or opinions of the top echelons of the organisation (Hervani et al., 2005; Lamming and Hampson, 1996). The minority of authors who have deliberately targeted non-executive employees invariably highlight the need for integrating the perspective of non-policy making staff (Kitazawa and Sarkis, 2000; Daily and Huang, 2001). Middle management and employee perception of environmental matters have rarely been examined (Craig and Lemon, 2008; Ramus and Steger, 2000; Chinander, 2001; Cantor et al., 2012). In conclusion, the literature review reveals a seemingly discreet reality where each soft KSF, despite some natural overlaps, appear to contribute univocally to improving environmental practices.

3. METHOD

3.1 Research design and data Collection

A case-study design is adopted for several reasons. As a methodological strategy it is an empirical enquiry that investigates a phenomenon within its real-life context when the boundaries of phenomenon and context are not yet clearly understood (Brannick 1997). This is exactly our case in examining the relationship between the different KSFs and their co-contribution to environmental management. Case study is recommended when the research is focused on contemporary events (Yin, 1994) and is an appropriate research approach to describe and explore new phenomena (Voss et al., 2002). According to Handfield and Melynk (1998), a multiple case study offers the possibility of providing in-depth understanding for the identification of patterns that link variables, as is the case of this paper.

3.2 Case Study Selection

Seven case companies were chosen from an initial survey of 143 ISO 14001 certified UK organisations. A large proportion of companies (95.3%) source some or all of their components from outside of the UK, although not surprising it does have implications for this investigation. It means that the environmental management of the overall supply chain is rendered more complicated. To investigate the impact of this type of activity and operations the authors believed it important to include a holistic perspective of environmental management, thus the respondents had varied profiles which included buyers, procurement specialists, operations managers and sales and commercial assistants. The questionnaire was completed by one member of each organisation surveyed.

For measurement about perceptions of the KSFs and green practices, survey respondents were asked to estimate on a five point Likert scale ranging from 1 `strongly agree`, to 5, `strongly disagree`. Rating scales allow the respondents to indicate the strength of their attitude toward a specific topic. Table I in the Appendix shows a sample of questions from the survey with the mean and min/max scores for each of the selected case companies. Exploratory Factor Analysis was used to test for reliability and Cronbach`s alpha score demonstrated high reliability for the items. The quantitative research adopted a threshold for Cronbach`s coefficient alpha of 0.70. The results of this coefficient for KSF Factors were 0.94, 0.79 and 0.75. The green practices results were 0.76, 0.79 and 0.71.

Since this paper aims to understand the roles of KSFs and their intervention pathways, two types of organisations are chosen for the case studies, those with relatively strong and those with poor outcomes in KSFs and environmental management practices. This can be regarded as purposeful or theoretical sampling because it provides an understanding of the relevance of behaviour related KSFs in two opposing settings. Our method for case company selection from the initial survey data is described as follows.

The questionnaire included an invitation to participate in follow up interviews, 12 organisations responded positively to this request. The final 7 case companies were selected based on the more extreme mean scores from the questionnaire. This meant that those with a low mean score, whose answers were typically between strongly agree and agree and those organisations with a high mean score whose answers were typically disagree or strongly disagree. These types of cases were chosen to exemplify an extreme or unusual manifestation of a characteristic or the outcome (Gerring and Seawright, 2007).

3.3 Data Collection

Table II outlines the main characteristics of the seven case companies. Here we also present the main features of each of the organisations activities and the current environmental actions. In each case we conducted multiple in-depth interviews with two or three informants to have their perception on how the KSFs were operationalised at their organisation which resulted in a total of 16 interviews. These informants were selected because of the operational knowledge of their organisation. This way, even when questions did not directly refer to environmental practices, we could be assured we were obtaining a ground level perspective of the topics under discussion. This operational perspective is supported by including a range of respondent type

profiles. To maintain a balance of opinions we have included both sustainability and supply chain related managers to have an impartial view of the phenomena under examination. Triangulation has its origins in attempts to validate research findings by generating and comparing different sorts of data, and different respondents' perspectives, on the topic under investigation. Different sources or methods for data collection are other ways to perform triangulations for the purpose of confirming the results (Catanzaro, 1988; Patton, 2002; Torrance, 2012).

Secondary data was collected from web sites, including annual reports, environmental/CSR policies, supplier evaluation questionnaires and newsletters. Both the secondary data and the use of multiple informants from each case company including both middle managers and environmental officers helps to triangulate data and enhance validity and reliability of the analyses (Yin, 2003).

INSERT TABLE II HERE

Each case company`s functional operations (including purchasing and distribution activities) is considered as the unit of analysis. Over a period of three months face to face, in-depth semi-structured interviews, telephone conversations and email correspondence were carried out. The interview protocol (see appendix IIa for an excerpt) included questions with respect to environmental issues of the organisation`s activities and contextual factors such as culture and values. In addition, more detailed questions were asked about how employees were made to feel responsible for their environmental actions and how the organisation communicated the importance of environmental impact to their employees. Issues such as methods of training used for environmental awareness and whether the organisation uses a rewards scheme for environmental initiatives were also explored. A sample of open ended interview questions is given in the appendix. The interviews begin with closed questions, often background questions, and gradually built to more open-ended questions. These may gather important background and permit the respondent time to become comfortable with the interview before being asked more sensitive or broad questions. The interviews were audio recorded and fully transcribed for analysis. This allowed the interviewer to take additional notes during the interview session

3.4 Data analysis

Content analysis has been used to analyse the case data (Arimura et al., 2011) with a focus on studying the effects of management practices (Chinander, 2001; Rothenberg, 2003; Sammalisto and Brorson; 2008). In quantitative content analysis, facts from the data are presented in the form of frequency expressed as a percentage or actual numbers of key categories (Neuendorf, 2002; Krippendorff, 2004;). This method condenses rather than reports all details concerning a message set, and the researcher tries to answer questions about how many (Neuendorf, 2002; Krippendorff, 2004). In qualitative content analysis, data are presented in words and themes, which make it possible to draw some interpretation of the results. Following the coding scheme recommendations of Guthrie et al. (2004) we began our coding process by using categories of KSFs retrieved from existing literature (see Table III). However, our coding did not rely solely on quantification or counting of KSFs, because analysis of interview transcripts is essential qualitative, and qualitative research can also be systematic, valid and reliable (Krippendorff, 2004).

More precisely we applied KSFs used in the literature as an initial basis about subject matters on which to build and develop our knowledge. For example, guided by the literature that management support might consist of encouragement and provision of an atmosphere which supports and motivates discussions (Daily et al., 2007; Wee and Quazi,2005), three practices from the interview transcripts were coded. By clarifying grounded concepts, we ensured that our codes are conceptually and empirically grounded (Dey, 1993).

INSERT TABLE III HERE

Using these pre-defined categories (i.e. KSFs), subject matters and rules for coding shown in Table II are established to ensure both latent and manifest information are captured to enhance objectivity, validity and reliability (Cullinane and Toy, 2000). Objectivity is ensured by specifying independent criteria for each mutually exclusive category (Weber, 1990) and rules are used to clearly distinguish one category from another. The codes for each of the six categories shown in Table II were developed by scanning the text and marking the words, phrases or sentences that dealt with the same topic. These were in turn sub-coded and labelled. For example, discussions related to training were labelled “TR” then sub-coded as “TR/VAR” for discussions which considered the variety of types of the training offered by the case

company. This method was continued for each interview and each category, dividing and subdividing codes as necessary. To enhance objectivity and validity, content was categorised based on the explicit rules of coding (Krippendorff, 2004). The rules of objectivity were assured by adhering to independent criteria as classified in Table III. To further ensure issues of validity and reliability we used peer debriefing. In this case the field researcher appointed other researchers not participating in the study to discuss emerging patterns in the data.

The next step involved fine tuning the coding. This consisted of creating a list of all the sub-codes, (e.g. "TR/VAR") and dividing them into sub components. In our example Training (TR), (the general variable) can be divided according to the state of the user (worker knowledge, skills,) to the variety (VAR) of the resources (workshops, on the job training, on-line assessments) used to carry out the training. It is through this method of coding that the poor and best practices emerged. For example, "Poor Practice 3" was coded (TR/VAR/basic) "Only basic training to comply with ISO 14001" since we now had a cross-case understanding of the level of training being delivered at each organisation. This method facilitated a more coherent and integrated description across the cases under analysis since we searched for relationships among these categories which facilitated grouping them into "best practices" or "poor practices" then further defined by the grounded concepts. As summarised in Table III the best and the poor practices are explained by the concepts which emerged from the interviews. This stage was key to the development of the paper as it highlighted the importance of organisations who regarded best practices as an organic part of organisational learning. Best practices are therefore understood in this paper as a basis from which to learn and question business methods.

4. Cross-case analysis

To elicit the interactions of KSFs we have re-arranged the data in a cross-case display, which illustrates the contrasting ways of adopting environmental management. Table IV groups the case studies into 2 families. To reach this grouping each company received a score for the best practices based on the interpretation of the level of commitment. These interpretations were confirmed by respondent validation - going back to the informants to check if they agreed with the classifications given the level of their practices To have included all the best and poor practice information from different respondents on from the seven case companies would have been convoluted and confusing Therefore, we present a level of commitment related to best practices only. We applied a disciplined process of comparing and constrasting across instances

to establish significant patterns, then further questioning and refinement of these patterns as part of an ongoing analytic process (Glaser and Strauss 1967). Here we also examined the reasons participants gave for deeming one activity more effective than another, regardless of the activity. Organisations listed in columns BCD and G show a tendency to integrative environmental management with a more personal approach. There is some level of variation in commitment and resources allocated to each. By contrast, those from AEF are more distanced and impersonal in their approach and there was considerable inconsistency between voluntary and compulsory actions.

The following categories emerged:

High level (***) shows a strong commitment to continuous environmental improvement. Medium level (**) shows a level of commitment which goes beyond the minimum requirements of ISO 14001. (*) means a basic level and (-) means a low level. Basic level shows the level of engagement which barely goes beyond the minimum requirements of ISO 14001. Low level shows little or no commitment to the spirit of environmental improvement.

INSERT TABLE IV HERE

Family 1 represents the companies that successfully control the KSFs through the adoption of specific best practices. They are examined as follows:

KSF 1 – *management support* is explained by two best practices. First, we found that some managers and directors are highly committed to environment-related values (BP1) and engage in corporate driven initiatives. Secondly, this characteristic was reflected by a management attitude that would facilitate resource deployment (BP2). The presence of these two best-practices is illustrated by the following quote, from company B: *"what they* (top managers) *value in this company is new ideas, initiatives and enthusiasm."*

KSF 2 – *Environmental training* is also explained by two best practices, which are well developed across the companies of this family. Having recognised the need to integrate environmental learning into their personal development reviews, companies B, D and G illustrate the best practice of integrating environmental training in the normal day-to-day organisation activity (BP3). On the other hand, companies C, D and G apply diverse techniques

to train and develop their staff in environmental issues (BP4). The adoption of this best practice is illustrated by a manager in company D: *"We`ve got formal training videos we can watch and all the rest (is done) just around the table, with the whiteboard, just thrashing things out."* Without dismissing the formal training method this company emphasise the importance of exchange and debate and to agree on the causes of environmental issues. At company G, selected personnel were consigned to teams for intensive environmental training courses which were conducted on an international scale.

KSF 3 – *communication* is made effective by adopting two best practices. *Information dissemination* (BP5) is translated into continuous display of updated environmental news, as in Company B. In the entrance hall there is a large model built of old recycled packing materials which underlines the differences in waste reduction between old and new materials and is a unique way of informing stakeholders. Communication vehicles such as employee surveys, suggestion boxes and individual or small group meetings with managers are common in these companies. *Two-way communication* (BP6) is particularly evident in companies B and C, although all companies in this family have successfully created an atmosphere where environmental discussion is encouraged between members of staff. In these companies, the dialogue is reinforced by existing "bottom-up" communication and the provision for regular on-going opportunities for employees to provide feedback. Management is aware that some of the best solutions to environmental problems are suggested by employees at operational level.

KSF 4 – *rewards and recognition* is explained by two best practices. BP7 corresponds to *stimulating meaningful contributions* through communication and an appropriate measure of incentives. The latter is reflected by a manager at company D: *"…if you know they've come up with some cracking ideas along the way that will also get recognised in their pay packet"*. Additionally, companies B, C, and D have integrated both financial and non-financial recognition for good environmental improvements or ideas into their rewards schemes. In all three cases the rewards helped to motivate and stimulate employees to behave in a more environmentally friendly way. A manager at company C stated: *"We had a clear out and the guys on the shop floor were involved…scrap had gone up then, value wise… we`ll be able to buy new equipment for the shop floor…"* Conversely, company G did not demonstrate commitment to the principle of a rewards scheme. BP8 means *enabling green motivation among colleagues*. Employees at companies B and C raise suggestions and voice their ideas so that a number of successful environmental improvements have been employee-led. A manager at company B said, *"I think it works both ways… if you take the bio-mass project that was an*

initiative driven by the site itself, by a project engineer who just read an article in a magazine and said 'Why aren`t we doing this?' …and it went upwards".

The fifth KSF – *employee responsibility* is explained by two best practices. First, as demonstrated by companies C, D, and G, respondents feel that generating responsibility is a continuous process to help employees understand that their jobs depend on sustainable behaviours. The corresponding best practice (BP9) then is to have a *high individual sense of responsibility* which is reflected in the quote from company D "*our livelihood depends on our actions*". Second, as illustrated by company B, a *sense of belonging* (BP10), "*we`re all in this together*" was apparent in most of the staff on their site due to the nature of the industry which is based on agricultural products thus depending on the natural environment. Company D follows a similar approach to achieve this fifth KSF.

The sixth KSF – *employee involvement* is explained by the participation in sustainability related initiatives outside the company (BP11). Engagement in outside events triggers ideas that are later experimented inside the company. These events include sustainability fairs, building recycling centres and forest and marine conservation events. Additionally, employee involvement is incentivised by organisational practices that lead to the creation of a participative atmosphere and the encouragement of employees to be involved in environmental issues and to find solutions (BP12).

The combination of the above KSF has thus facilitated the spread of best environmental practice throughout the organisation and supply chain activities. Improvements in environmental practices in family 1 include the optimisation of the numbers of trips and collaborating with other industry members to maximise full truck loads were continuously researched and progress had been made (EMP2). Similarly, energy consumption (EMP2) has decreased in all four of the companies. It was a priority environmental issue as it was considered "low hanging fruit." Company B has taken effective measures to reduce packaging by introducing a plastic pouch for milk retail. Packaging is reduced by 75%. Company C is also aware of waste which can be produced from misuse of packaging materials. During a two-year project they reused the packaging (EMP3) from a supplier to protect their own goods on return journeys (EMP2). A policy to seek out similar opportunities prevails. The other two companies (D and G) are also very conscious of the on-going need to reduce packaging waste. Both the financial and environmental impacts of waste in packaging and production are examined (EMP3, EMP1). C, D and G all had integrated lean manufacturing techniques prior

to gaining their ISO 14001 certification and found that these changes also had environmental benefits. Company B is investing in a software tool which will allow a complete analysis of "milk miles" from farm collection to delivery to the customer. The logistics manager agrees that "*there is plenty of opportunity there as well" (*EMP2) Company D is working with a local university research laboratory to create a more environmentally sound raw material for one of their biggest selling products (EMP1). Similarly, company G has integrated design for the environment into some of their products (EMP1); this has meant continuous collaboration with suppliers to decrease total CO_2 emissions of the product (EMP2).

Family 2 in table IV shows the remaining three companies which demonstrate poor level of commitment to KSFs. Management support (KSF1) is low across the three companies. They have a lower level of corporate driven initiatives for environmental improvements (PP1). Company F has appointed green leaders at low to mid management level; nevertheless, these individuals feel obliged to demand more cooperation from their management to advance environmental activities at their site. "*We've appointed environmental champions…. "green leaders… they get together on a teleconference occasionally and share ideas about what people were doing at their site and what they needed to help them… to get some sort of central support"* (Company F). This situation is paradoxical given the original management initiative. Perhaps it is a call by the green leaders for more corporate level support.

Regarding stimulating motivation among employees Company E depends on the drive from their managing director who was particularly motivated to step up environmentally friendly behaviour and had adopted a 'hands on' approach to doing so. Despite this willingness the efforts of this single individual are not enough to spur on other employees. Lack of motivation at corporate level is translated into lack of conviction both from managers and workers (PP2). This is reflected, for instance, by company A where the environmental awareness programme is mandatory, *"everybody has to go and you sit through it…"* However, very little enthusiasm has been generated by this programme. The same informant believes the organisation to be *"forward thinking in product development",* which he thinks is more closely linked with financial performance and which takes precedent over consideration for the environment.

KSF 2 - *environmental training* is also less considered and valued in this family of companies. Training standards in company F are illustrated by *"We've done a little, I would say only a little, and there were some on-line training sessions with our product management and their sales team, on sustainability and environmental issues. Just really explained to them*

what it's about... but it's (an) area that did fizzle out". This is a confirmation that the training was of a minimum standard to comply with the ISO 14001 (PP3). In both company A and F only employees deemed to have tasks with direct environmental impact are offered limited and basic training (PP4). Company A focuses their resources on keeping up with legislative requirements and adapting manufacturing processes to replace components which will have restrictions in the future.

KSF 3 – *Communication* is also characterised by poor practices. Many of the practices in this family are grounded in ineffective streams of interaction (PP5) between the different departments and from top to middle management. In company A the importance of environmental management is not extended beyond technical improvement of the product. Problems with green leaders in company F can be traced to poor communication (PP5) but also to the passive nature of information sharing (PP6). Company E limits its communication efforts on environmental information to posting its policies on the Health and Safety Notice board.

KSF 4 – R*ewards and recognition* is restricted by two poor practices (PP7 and PP8) adopted by companies A, E, and F. The logistics manager at company A confirms that even if *"we were to achieve considerable environmental improvements the recognition would be insignificant"* (PP7). Although company F has experimented with different types of reward schemes their current system does not explicitly recognise environmental innovation (PP8); …"*we do have a company bonus scheme linked to costs and profits. It is a distant link between what they get at the end of the year and what they have done to improve things".* If environmental innovation is not explicitly rewarded it could also reduce its status as an area for development by employees.

KSF 5 – *Employee responsibility* is not encouraged by companies from this family. There is a lack of connection between every day activities and environmental impact (PP9) which is felt in the operations divisions across all three of these companies. (Company E) *...had a bit of an argument with a shop floor guy yesterday about taking away collars on pallets. The guy is paid to build pumps or motors. He`s not paid to pick up bits of wood"* The view is that the environment is not a part of this employee`s role (PP10) and reinforces a lack of conviction of management in general (PP2). The "this is not my problem" approach (PP10) to environmental damage caused by production is also apparent at companies A and E, *"There are a lot of people that aren't aware of the impact to the environment from logistics. I think there is a bit of a*

cultural reason behind that of "it is not my issue" (Company A). In particular this lack of interest is manifested through a lack of connection between role and environmental impact (PP 9) at company E.

KSF 6 – *Employee involvement* is compromised by the adoption of two poor practices. Employees are not empowered (PP11) and environmental related activities create conflict within the organisation (PP12). Cross functional teams at company F do not provide satisfactory outcomes as their intervention is an irregular and have also resulted in disputes. The meetings have been ineffective due to a reduction in momentum after ISO 14001 was awarded and also due to a lack of empowerment. Green leaders from company F felt frustration towards other colleagues who are not willing to cooperate. The team is pressed to ask for assistance from senior management which is difficult to find (PP1). This is illustrated by an informant from Company F *"I'd have to say within the last twelve months or so the emphasis has dropped somewhat so they probably need reinvigorating*".

All case companies in Family 2 demonstrate poor practice in environmental management and show a lack of enthusiasm for exceeding environmental requirements beyond ISO 14001. It should be emphasised that overall informants from this family of companies agreed that the negative impacts to the environment related to manufacturing activities were mainly ignored (EMP1) and the priority was on immediate economic issues. This precedence for financial security means that none of these sites had made substantial investments to reduce the environmental impact.

The supply chain is also mostly ignored in company A, *"The Dow Jones mechanism is just "to the door". Once it goes out of the door, then we don't measure it. There isn't any push on me as Logistics Manager to find a measurement for it either. It is not an area that they (Senior Management) are particularly focusing on"* (Company A). In company A external activities are side-lined in comparison with internal manufacturing processes.

Companies E and F have recognised a need to reduce the environmental impact of their supply chain activities although packaging practices tend to follow only customer demands (EMP3). Company A is an extreme case given that business was lost because they refused to comply with some of their customers' local environmental requirements. At the time of the interviews the company was not managing the return or recycling of empty packaging (steel tins). Company F showed evidence of a relationship between organisational conflict and a

breakdown in communication which led to ignoring environmental manufacturing objectives (EMP1). In company A no targets for environmental objectives were set. Since environmental issues are not priority at A, E and F it is not unexpected that supply and delivery transport networks are not optimised (EMP2). Company A's informant also stressed that the local modal shift opportunities that are available have been neglected and ignored by senior managers because of time and cost. Company E and F did not stress such severe disregard for transportation network improvements but showed no tendency to change current methods.

5. Model and intervention paths

5.1 Identifying KSF roles in developing intervention paths

Here we build on the relationships between best practices elicited through the data analysis. The purpose is to develop a framework that depicts the intervention paths leading to improved environmental practices (see Figure 1). Table V in the appendix provides the background evidence from the case organisations to support the development of the paths. The previous latent content analysis process, which included gaining a deep understanding of the reasons and motivations that each respondent gave for considering one best practice more significant in motivating or triggering another, was vital in the development of our framework,: which is explained below:

INSERT FIGURE 1 HERE

The best practices resulting from the data analysis can be interpreted as variables towards increasing EMP through the correct operationalisation of the soft KSFs. They are arranged as antecedent variables or independent variables, intervening variables, and outcome variables or dependent variables. This division of variables is inspired by Tolman's (1938) studies in behavioural science. Antecedent variables are the existing underlying conditions which provide part of the impulse for, attention to, and maintenance of EMP. For instance, when top management values are manifested from the outset (antecedent variable), it is likely that deployment of resources will be more widespread and lead to adoption of best practices. Intervening variables are practices which transform environmental policies and management concerns into environmental initiatives such as participating in finding solutions and being

engaged in initiatives outside the organisation. For example, integrated varied training (BP8) (conditional variable) does not necessarily directly lead to results; rather it stimulates individual responsibility (BP5) and thus a change in employee behaviour. These changes in attitude, along with another three behavioural best practices impact the outcome variables and make a substantial difference to an organisation`s overall environmental footprint. The outcome variables result from the effect of the antecedent variables on the intervening variables. In this way, we are eliciting the dynamics between KSFs that allow organisations to evolve from an early stage, where the need for improving environmental practice is recognised to an advanced stage where the practices are established.

This framework underlines the importance of the antecedent variables, top management values (BP1) and resource deployment (BP2), in the enactment of subsequent practices that together enhance EMP. In those organisations where top management environmental values are positive and consistent (BP1) resources are facilitated for green projects and initiatives (BP2). We also observe that resource deployment (BP2) leads to both integrated (BP3) and varied training (BP4). Simultaneously resource deployment stimulates contributions (BP7) and motivates employees to engage in environment-friendly practices (BP8), which in turn leads to increased levels of participation in finding solutions for environmental issues (BP11) as well as employee's involvement in green activities outside the company (BP12). It becomes evident that resource deployment has vital consequences that can be better explained than simply emphasising "providing management support and commitment", as suggested in the literature (Wee and Quazi, 2005).

Management support (KSF1) also directly influences the enactment of KSF6 – *employee involvement*. The quote retrieved from case company B, *"what they* (top managers) *value in this company is new ideas, initiatives and enthusiasm. ...in this company it doesn't matter whether you're an assistant or a trainee who just joined two days ago, or you are a top regional manager, either can have a good idea which can be turned into a multi-million project during the next month"* illustrates how resource deployment (BP2) affects participation in finding solutions for environmental problems (BP11) since employees can be assured of obtaining the means to realise their ideas. Resource deployment by top management also explains why companies C and G promote the creation of green teams to solve environmental problems. Concurrently, company D, which has fewer employees has made considerable effort to "convert" each individual employee into a green champion.

According to our findings, employee responsibility (KSF5) depends on environmental training (KSF2). Data revealed that employee responsibility is enhanced when the organisations have environmental training integrated in their normal activity (BP3) and training is provided through various methods (BP4). This interaction is illustrated by a quote from company B: "*In this company in the induction for new employees, there is a section which covers the environment but it`s (more like) do we live and breathe it every day on the shop floor?"*

Communication (KSF3) is influenced by KSF1 in the sense that top management values (BP1) and resource deployment (BP2) define the amount, direction, and content of communication. Concurrently it shapes the rewards and recognition mechanisms put in place in the companies (KSF3) and the involvement of employees in internal and external green activities (KSF6). Dissemination of information (BP5) together with the possibility of a two-way communication (BP6) creates more enthusiasm among employees to collectively participate to find solutions to environmental problems (BP11) and assists in motivating employee engagement in environmental initiatives outside the company (BP12). This is illustrated by a quote from company D: "*A lot of things that we'd never even thought about came out, like how we could improve awareness and people actually started changing behaviours because they could see that it's going to reduce our costs and do the company a favour."*

This framework illustrates how the relationships between KSFs are based on existing relationships between best practices and explains how the operationalisation of the latter can lead the company towards effective environmental practice.

5.2 Developing theoretical propositions from the framework.

Our framework shows certain practices facilitate the uptake of others. This has implications for our understanding of how KSFs operate and what organisations should put in practice and in what sequence to increase the levels of environmental practice. As shown by the framework, management support of the adoption of environmental practices is at the base of all other efforts by the organisation to achieve higher levels of performance.

The role of top management in the adoption and dissemination of environmental policies and practices is widely debated in the literature (Sarkis et al., 2011). It includes the necessary conditions for employees not only to participate but also to actively engage in environmentally-friendly, environmental practices. As leaders of the organisation, they can influence it and otherwise install the decision-making mechanisms and processes that are aligned with their own beliefs and values in a way that these become reflected in organizational practices (Rost & Smith, 1992). The strategic direction of these leaders are examples of the tools that, together with top managers' guidance and coordination of the strategic process, enable and facilitate organizational change (Yukl, 2010), including the one related to the adoption of environmental practices. Starting with top management support, our framework shows four pathways to improve environmental practice.

First path. Managers use training to enhance employee responsibility, which in turn is likely to lead to higher levels of environmental practice. This first path is sustained by managers' willingness to reflect their values in the attitudes of their organizations (Messick and Bazerman, 1996). When managers are convinced of the importance of green practices they are likely to support training activities that facilitate their adoption. Kohlberg (1969) first hinted at the importance of training for overall enhancement of moral development. While he was referring to specific moral training, the same principle should apply to practices that are related to or lead to a higher level of moral development, such as those related to greening the organisation.

Directed training enhances employee responsibility and ultimately performance in the targeted areas (Stiles et al., 1997). This occurs because training is perceived by the employees as a confirmation of the organisation's commitment to them, thus reinforcing the psychological contract binding both parties. Specific training on environmental issues allows for a better definition of employee's knowledge and responsibility in this field (Daily & Huang, 2001; Ramus, 2002) and to increased levels of employee engagement in environment-related issues (Corporate Leadership Council, 2004). Given its effect on responsibility, training allows for employee empowerment since the latter needs high levels of competence and self-determination (Spreitzer, 1995). Responsible and environment-sensitive, empowered employees achieve higher levels of environmental practice (Brammer and Pavelin, 2006) because they are willing to engage in new practices and adapt to new needs (Macey & Schneider, 2008) to achieve novel solutions using creative processes (Zhang and Bartol, 2010).

Thus, our first proposition:

Integrated and varied environmental-related training (KSF 2) supported by environmental-wary managers (KSF 1) is likely to trigger higher levels of employee responsibility and engagement (KSF 5) which in turn lead to better environmental practices.

Second path. In this path supportive managers utilise communication to involve employees through varied methods of training, which leads to improved environmental practices. Conveying management principles and values serves the purpose of showing the direction intended for the organisation and the practices demanded of the employees (Stone, 2006). In their definition of ethical leadership, Brown and colleagues refer to "the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making" (2005: 120). Managers concerned about the environmental impacts of their organisations, ethical leaders use communication to promote shared meaning of purpose and of necessary action (Carton et al., 2014) in accordance with the desired green direction for the organisation.

This leads us to our second proposition:

Information dissemination and two-way communication (KSF 3) supported by top management (KSF 1) is likely to trigger employees' engagement both inside and outside the company (KSF 6) which in turn leads to improved environmental practice.

Third path. Managers use rewards and recognition to incentivise employee's involvement and reach increased levels of green performance. This can be done both directly and indirectly. Directly, managers acting within the specific boundaries of their managerial roles can define the rewards and compensation practices of the company. Indirectly, in their role of active creators or influencers of the organisation's culture (Schein, 2010), top managers can reflect their beliefs and values in explicit and implicit mechanisms of acceptance or disapproval.

If top managers support the idea of a greener organisation and want to encourage green practices by their employees, they should find the correct mechanisms and implement the

correct incentives to do so. Employee involvement is likely to lead to engagement in practices that lead to increased environmental practice.

This leads us to our third proposition:

> *Motivation mechanisms (KSF 4) supported by top management (KSF 1) are likely to trigger engagement both inside and outside the company (KSF 6) which in turn leads to better environmental practice.*

Fourth path. This refers to direct top management support for employee involvement, which leads to heightened levels of improvement. Top managers' participative style and ability to communicate appear to lead to organisational commitment as well as organisational and superior support. Concurrently, ethical leadership behaviours are likely to trigger corresponding ethical efforts from followers (Brown et al., 2005). Involved employees are then likely to actively contribute to the environmental cause.

This leads to our final proposition:

> *Resources deployed by supportive top management (KSF 1) are likely to trigger engagement both inside and outside the company (KSF 6) which in turn leads to better environmental practice.*

6. Conclusion and future research

This paper contributes to the development of intervention theory which focuses on understanding the process of how appropriate conditions and best practices are put in place to create positive employee behaviour for improving environmental practice. Particularly resonant with our research is how "interventions should generate a situation in which actors believe that they are working to internal rather than external influences on decisions" (Argyris, 1970). Our findings indicate that it is important to establish the antecedents and conditions which trigger or allow other best practices to develop. Moreover, it is essential to identify which best practices are effective as well as understand how they should be implemented. Furthermore, this research complements the work of Lülfs and Hahn (2013) who propose that

to explain voluntary employee behaviour beyond organizational tasks a model must be proposed in order to uncover important determinants.

Given the difficulty of organisations to evaluate soft KSFs the intention is to further current recommendations by providing a specific process orientation of best practices. The paper brings new perspectives to existing theories which largely consider all soft SKFs as antecedents, and rely on mediation variables such as organisational support (Cantor et al., 2012) and team work (Daily, 2007). Based on the in-depth case analyses we further demonstrate the need of dividing the KSFs into antecedents and intervening variables. Here we further divide intervening variables into conditions and behaviours. Conducive conditions include resource deployment to provide training, stimulate contributions, participation in solution finding as a way in which the senior management effectively demonstrates visible leadership, information dissemination that helps employees engage with the outside world and bring back innovative ideas, and two-way communication that stimulates contributions.

From a managerial perspective this paper provides original contextual evidence which could assist those practitioners looking to improve environmental practice. The paper also demonstrates the potential positive or negative effect of a single individual in an organisation. One person with a passion for the environment can make a considerable organisational contribution towards environmental improvement. Furthermore, a key contribution of this paper is not whether ISO 14001 manufacturers should have a specialist person or group for environmental issues but focuses on how such specialist persons or groups are being supported.

Some methodological limitations must be acknowledged. Although subjective measures based on perceptions are frequently used in literature, and they can be considered valid for a first approach to study the roles of KSFs, a combination of objective and subjective measures in future research may be desirable. In this paper, the researchers were more interested in an in-depth understanding of a specific issue and in showing different perspectives rather than aiming at singular truth and generalisation (Patton, 2002), Furthermore, to verify the validity of the framework and propositions in this study it is recognised that it would need to be further empirically tested with large-scale surveys.

References

Accenture, 2016, *"Agenda 2030: A window of opportunity*": UN Global Compact-Accenture CEO study 2016", Accenture.

Ammenberg, J. and Hjelm, O., 2003. Tracing business and environmental effects of environmental management systems—a study of networking small and medium‐sized enterprises using a joint environmental management system. *Business Strategy and the Environment*, 12(3),163-174.

Ammenberg, J., Hjelm, O. and Quotes, P., 2002. The connection between environmental management systems and continual environmental performance improvements, *Corporate Environmental Strategy*, 9(2), 183-192.

Arimura, T.H., Darnall, N. and Katayama, **H**, 2011 Is ISO 14001 a gateway to more advanced voluntary action? The case of green supply chain management *Journal of Environmental Economics and Management,* 61:170-182

Armstrong, M.A.A., 1991. *A Handbook of Personnel Management and Practice.* Fourth Edition. London: Kogan Page.

Bansal, P. and Roth, K. (2000), "Why companies go green: a model of ecological responsiveness", *Academy of Management Journal*, 43: 717-748.

Berry, M.A. and Rondinelli, D.A., (1998). Proactive environmental management: A new industrial revolution. *The Academy of Management Executive.* 12:.38-50.

Boiral, O. (2006). « La certification ISO 14001: une perspective néo-institutionnelle », Management International, 10(3): 67-79. **Brammer, S. J., & Pavelin, S**. (2006). Corporate reputation and social performance: The importance of fit. *Journal of Management Studies*, 43: 435-455.

Brannick, T. and Roche, W.K. (Eds) (1997), Business Research Methods: Strategies, Techniques and Sources, Oaktree Press, Dublin.

Brown, M. E., Treviño, L. K., & Harrison, D. A. (2005). Ethical leadership: A social learning perspective for construct development and testing. *Organizational behavior and human decision processes*, 97(2), 117-134.

Cantor, D.E., Morrow, P.C. and Montabon, F., (2012). Engagement in environmental behaviours among supply chain management employees. An organizational support theoretical perspective, *Journal of Supply Chain Management*, 48:33-51.

Carton, A. M., Murphy, C., & Clark, J. R. (2014). A (blurry) vision of the future: How leader rhetoric about ultimate goals influences performance. *Academy of Management Journal*, 57: 1544-1570.

Castka.P, & Balzarova, M,A (2008) "Adoption of social responsibility through the expansion of existing management systems", Industrial Management & Data Systems, Vol. 108 Issue: 3, pp.297-309

Catanzaro,M, 1988, Using qualitative analytical techniques: In Woods, N. and Catanzaro, M., Eds., Nursing Research: Theory and Practice, Mosby Incorporated, St Louis, 437-456.

Chinander, K.R., 2001, Aligning accountability and awareness for environmental performance in operations. *Production and Operations Management,*10:276.

Comoglio, C. and Botta, S., (2011), The use of indicators and the role of environmental management systems for environmental performance improvement: a survey on ISO 14001 certified companies in the automotive sector. *Journal of Cleaner Production,* Vol 20, pp.92-102.

Cook, J. and Seith, B.J., (1993), Environmental training: It's the law! *Journal of Environmental Regulation,* 3(2), pp.141.

Conger, J.A and Kanungo R. K. (1998), The Empowerment Process: Integrating Theory and Practice. *Academy of Management Review*, Vol. 13, No. 3, pp. 471-482.

Craig, J.H.S. and Lemon, M., (2008). Perceptions and reality in quality and environmental management systems. *TQM Journal,* 20(3), pp.196

Crilly, D., Schneider, S. C., & Zollo, M. (2008). Psychological antecedents to socially responsible behavior. *European Management Review*, 5(3), 175-190

Cullinane, K., Toy, N., 2000. Identifying influential attributes in freight route/mode choice decisions: a content analysis. Transportation Research Part E Vol 36, pp.41–53.

Daily, B.F., Bishop, J.W. and Steiner, R., (2007). The Mediating Role of EMS Teamwork as it Pertains to HR Factors and Perceived Environmental Performance. *Journal of Applied Business Research,* Vol 23, No.1, pp. 95-110.

Daily, B.F. and Huang, S., (2001). Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations and Production Management,* Vol 21, No.12, pp.1539.

Daily, B. F, Massoud, J, W. and Jacob A. (2012) *International Journal of Operations & Production Management* Vol 32, No 5, pp 631-647.

De Oliveira, O.J. and Muniz Serra Pinheiro, C.R., 2009. Best practices for the implantation of ISO 14001 norms: a study of change management in two industrial companies in the Midwest region of the state of Saõ Paulo – Brazil. *Journal of Cleaner Production,* Vol17, pp.883-885.

De Giovanni P, 2012 Do internal and external environmental management contribute to the triple bottom line? International Journal of Operations & Production Management Vol 32. No.3, pp265-290.

Deci, E. L., & Ryan, R. M. 1985. *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

del Río González, P. 2005, Analysing the factors influencing clean technology adoption: a study of the Spanish pulp and paper industry. *Business Strategy and the Environment*., 14: 20–37.

Denton, K., 1999. Employee Involvement, pollution control and pieces to the puzzle. *Environmental Management and Health*, Vol 10 No.2, pp.105-111.

Eurostat (http://ec.europea/eu/Eurostat/)

Fudge, R.S. and Schlacter, J.L. 1999, "Motivating employees to act ethically: an expectancy theory approach", *Journal of Business Ethics*, Vo. 18, No. 3, pp. 295-304.

Gattiker, T.F. and Carter. C.R., 2012, "Understanding project champions' ability to gain Intra-organizational commitment for environmental projects," *Journal of Operations Management*, Vol. 28, No. 1, pp. 72-85.

.Stank, T. P, & Goldsby, T. J, 2000 "A framework for transportation decision making in an integrated supply chain", Supply Chain Management: An International Journal, Vol. 5 Issue: 2, pp.71-78,

Gerring, J. and Seawright, J, 2007 'Techniques for choosing cases' in Gerring, J (ed)

Case Study Research: Principles and Practices . New York: Cambridge University Press, pp.86 150

Govindarajulu, N. and Daily, B.E., 2004. Motivating employees for environmental improvement. *Industrial Management and Data Systems,* Vol 104, No. 4, pp.364-372.

Guerci, M, Longoni, A, & Luzzini, D, 2016, 'Translating stakeholder pressures into environmental performance -- the mediating role of green HRM practices', *International Journal Of Human Resource Management*, 27, 2, pp. 262-289,

Guthrie, J., Petty, R., Yongvanich, K., Ricceri, F., 2004. Using content analysis as a research method to inquire into intellectual capital reporting. Journal of Intellectual Capital Vol 5, No. 2, pp.282–293.

Grant, D., Trautrims, A., Wong, C.Y., 2017 Sustainable logistics and supply chain management: Principles and practices for sustainable operations and management. Kogan Page: London.

Grawitch,M.J Ledford,G.E, Ballard, D.W and Barber,L.K. 2009, Leading the healthy workforce: The integral role of employee involvement. *Consulting Psychology Journal Practice and Research,* Vol.: 61, No. 2, pp 122-135

Jabbour, C.J.C. and Santos, F.C.A., 2008. Relationships between human resource dimensions and environmental management in companies: proposal of a model. *Journal of Cleaner Production,* Vol 16, No.1, pp.51-58.

Jiang, D-Y., Lin, Y-C, and Lin, L-C., 2011. "Business moral values of supervisors and subordinates and their effect on employee effectiveness", *Journal of Business Ethics*, Vol. 100, pp. 239-252.

Handfield, R.B and Melnyk, S.A 1998. The scientific theory-building process: a primer using the case of TQM. *Journal of Operations Management* Vol 16, pp.321–339.

Hart, S. and Milstein, M. 2003. "Creating sustainable value." Academy of Management Executive, 17(2):56-69.

Hervani, A.A., Helms, M.M. and Sarkis, J., 2005. Performance measurement for green supply chain management. Benchmarking, 12(4), pp.330.

Kalleberg, A.L, 1977 Work Values and Job Rewards: A Theory of Job Satisfaction. *American Sociological Review.* Vol. 42, Feb, pp.124-143.

Kanter, R.M .1983. The change masters: Innovations for productivity in the American corporation. Simon and Schuster, New York.

King, A. and Lenox, M., 2002. Exploring the locus of profitable pollution reduction. *Management Science*, 48(2), pp.289-299.

Kitazawa, S. and Sarkis, J., 2000. The relationship between ISO 14001 and continuous source reduction programs. *International Journal of Operations and Production Management,* Vol 20 No. 2, pp.225.

Klassen, R., D. C. Whybark. 1999. Environmental management in operations: The selection of environmental technologies. *Decision Science*, 30(3), 601-631.

Kohlberg, L. 1969 Stage and sequence: The cognitive-developmental approach to socialization. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (pp. 347-480). Chicago: Rand McNally.

Krippendorff, K. (2004). Content analysis: an introduction to its methodology. Sage: London.

Laabs, J.J., 1992. *The Greening of HR.* Personnel Journal, pp.60-71.

Lamming, R. and Hampson, J., 1996. The environment as a supply chain management issue. *British Journal of Management*, 7, (1) pp.45-62

Lawler III, E.E., 1994. Total Quality Management and employee involvement: Are they compatible? *Academy of Management Executive*. Vol 8, No 1,pp.68-76.

Lülfs, R, & Hahn, R, 2013. 'Corporate Greening beyond Formal Programs, Initiatives, and Systems: A Conceptual Model for Voluntary Pro-environmental Behavior of Employees', *European Management Review*, 10, 2, pp. 83-98

Macey, W., & Schneider, B. 2008. The meaning of employee engagement. *Industrial & Organizational Psychology*, 1(1), 3-30.

Melnyk, S. A., Sroufe, R. P., Calantone, R. 2003. Assessing the impact of environmental management systems on corporate and environmental performance. *Journal of Operations Management*, 21, 329-351.

Messick, D. M., & Bazerman, M. H. 1996. Ethical leadership and the psychology of decision making. *Sloan Management Review*, 37, 9-22.

Morrow, D. and Rondinelli, D., 2002. Adopting Corporate Environmental Management Systems: Motivations and Results of ISO 14001 and EMAS Certification. *European Management Journal*, Vol 20, No 2, pp.159-171.

Oglethorpe, D and Heron, G , 2010. Sensible operational choices for the climate change agenda. *International Journal of Logistics Management* Vol 21. No.3, pp 538-557.

Patton, K.R. and Daley, D.M., 1998. Gainsharing in Zebulon: What do workers want? *Public Personnel Management,* 27: pp.117.

Patton, M., (2002). Qualitative Research and Evaluation Methods, Sage Publications, London.

Perron, M.G., Cote,.R.P. and Duffy, J.F., 2006. Improving Environmental Awareness Training in Business. *Journal of Cleaner Production* Vol 14, No.6-7, pp.551-562.

Ramus, C.A., 2002. Encouraging innovative environmental actions: What companies and managers must do. *Journal of World Business*, Vol. 37, No.2, pp.151.

Ramus, C.A. and Steger, U., 2000. The roles of supervisory support behaviours and environmental policy in employee "eco-initiatives" at leading-edge European companies. *Academy of Management Journal*, Vol 43, No.4, pp.605.

Ronnenberg, S.K, Graham, M.K. and Mahmoodi, F., 2011. The important role of change management in environmental management system implementation. *International Journal of Operations and Production Management,* Vol 31 No.6, pp.631-647.

Rost, J. and Smith, A. 1992. Leadership: A post-industrial approach. *European Management Journal*, Vol. 10, No. 2, pp. 193-201

Rothenberg, S., 2003. Knowledge content and worker participation in environmental management at NUMMI. *The Journal of Management Studies,* Vol 40, No.7, pp.1783.

Sammalisto, K. and Brorson, T., 2006. Training and communication in the implementation of environmental management systems (ISO 14001): A case study at the University of Gävle, Sweden. *Journal of Cleaner Production,* 16: 299-309.

Sarkis, J., Zhu, Q., and Lai K., 2011 An organizational theoretic review of green supply chain management literature *International Journal of Production Economics*, 130, (1), pp 1–15.

Sarkis, J., Gonzalez-Torre, P., and Adenso-Diaz, B 2010 Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management,* 28:163–176

Schein, E. H. 2010. *Organizational culture and leadership* (Vol. 2). John Wiley & Sons.

Sharma, S., 2000. Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal*, Vol 43:681--697.

Spreitzer, G. M. 1995. Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of management Journal*,38:1442-1465.

Stone, L. J. 2006. Limitations of cleaner production programmes as organizational change agents. II. Leadership, support, communication, involvement and programme design. *Journal of Cleaner Production*, 14(1), 15-30.

Stiles, P., Gratton, L., Truss, C., Hope-Hailey, V., & McGovern, P. 1997. Performance management and the psychological contract. *Human Resource Management Journal*, 57-66.

Tolman, E.C., 1938. The determiners of behaviour at a choice point. *Psychological Review,* 45:1-41.

Torrance, H 2012 Triangulation, Respondent Validation, and Democratic Participation in Mixed Methods Research Journal *of Mixed Methods Research* Vol 6, Issue 2, pp. 111 – 123.

Voss, C. Tsikriktsis N, and Frohlich, M, 2002 Case research in operations management. *International Journal of Operations & Production Management,* 22 :195–219

Weber, R.P. 1990. Basic content analysis. Sage: London.

Wee, Y.S. and Quazi, H.A., 2005. Development and validation of critical factors of environmental management. *Industrial Management and Data Systems*, 105:.96.

Wehrmeyer, W., 1996. *Greening People: Human resources and environmental management.* Sheffield, Greenleaf Publishing.

Wilms, W.W., Hardcastle, A.J. and Zell, D.M., (1994). Cultural Transformation at NUMMI. *Sloan Management Review,*36:99.

Woo, C, Kim, M, Chung, Y, & Rho, J, (2016). Suppliers' communication capability and external green integration for green and financial performance in Korean construction industry. *Journal Of Cleaner Production,* 112: 483-493.

Wong, C.W.Y., Wong, C.Y., Boon-itt. S, 2017. "How does sustainable development of supply chains make firms lean, green and profitable? A resource orchestration perspective." *Business Strategy and the Environment*,10.1002/bse.2004

Wong, W.Y.L., 1998. A holistic perspective on quality quests and quality gains: The role of environment. *Total Quality Management,* 9: pp41.

Yin, R. 1994. *Case study research: Design and methods* (2nd ed.). Thousand Oaks, CA: Sage Publishing.

Yukl, G. 2010. *Leadership in Organizations* (7th Edition). New Jersey: Pearson

Zhang, X., & Bartol, K. M. 2010. Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal*, 53(1), 107-128.

Zhu, Q; Sarkis, J Lai, K-H, 2012. "Examining the effects of green supply chain management practices and their mediations on performance improvements". *International Journal of Production Research,* 50 1377.

FIGURES AND TABLES

Table I Example of min/max scores for Environmental management practices survey questions - Selected Case Companies

	Min/Max scores							
	Selected Case Companies	A	B	C	D	E	F	G
Environmental ManagementPractices – Example Survey Questions	My company has been able to use cleaner transportation methods	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to consolidate shipments to reduce carbon emissions	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to focus on production planning and control to reduce waste	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to focus on product design to reduce resource consumption. (water, gas, electricity)	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to focus on product design to reduce waste generation.	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to introduce packaging reusability	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to recuperate materials used in production	1 4	1 2	1 2	1 3	1 5	1 5	1 2
	My company has been able to incorporate recycling systems for production waste	1 4	1 2	1 2	1 3	1 5	1 5	1 2

Table II. Case companies & interviews

Case ID	**Year established & (Certified ISO14001)**	**Products & (No. of employees)**	**Main features of environmental impact(E.I) and current actions(C.A)**	**Informants' job descriptions & length of interview**

A	1904 (2000)	Paint and industrial coatings (900)	**E.I**: Ozone pollution through emissions of volatile organic compounds (VOCs). **C.A:** investment and research in developing alternative substances	European Logistics Manager (2hrs) & Technical Manager (1.5hr) Environmental Officer (1 hour)
B	1960s (2001)	Dairy Products (400)	**E.I**: High water consumption (4 gallons of water per gallon of milk produced) and energy use. **C.A** Investment in high pressure/low volume cleaning systems and training on water saving techniques. New packaging designs to reduce waste. Consolidation of inbound raw materials and collaboration with farmers to reduce contamination.	Supply Chain Manager (1.5hr) for liquids division & Manufacturing ; Design Manager (1.5hr) (responsible for renewable energies, reducing energy consumption and new facilities design)
C	1962 (2008)	Marine Equipment (100)	**E.I** Metallic and Energy Waste from product manufacturing. **C.A.** Waste sold as scrap for recycling. Training on metal sorting.	Supplier Development Manager (2hrs) & Logistics Manager (2hrs). Environmental Quality Assurance Assistant (30 mins)
D	1975 (2010)	Composites (120)	**E.I** Solvent release during processing. **C.A.** Investment in researching alternative solvent reducing formula for composite manufacturing.	Commercial Director (1hr 15 mins) & Operations Manager (1hr)
E	1950s (2001)	Pumps, Motors and Valves for	**E.I.** Use of complex hydraulic oils, metal waste and pallet packaging waste.	Supply Chain Manager (1hr 45 mins) & Environmental Officer (30mins)

		Marine and Mining (320)	**C.A** Reducing packaging waste	
F	1924 (2009)	Ingredients for food, pharmaceutical & health care (140)	**E.I**: Green House Gas emissions from production. **C.A** Training on energy saving techniques	Regional Manager (1hr 15mins) & Sustainability Manager (45 mins)
G	1975 (2001)	Vehicle and Aircraft components (340)	**E.I**: Powder metallurgy residual heat production and high CO_2 emissions. **C.A** limiting energy consumption, reducing waste per unit of production, reducing CO_2 emissions.	Supplier Chain Quality Assurance Manager (2hrs) & Risk and Safety Manager (45 mins)

Sample of Interview Questions

- **How does your company communicate the importance of environmental impact to you?**

- **In what way are you involved in environmental activities?**

- **Does the environmental policy reflect the values of all of the company members, not just those of top management or shareholders?**

- **What methods of training are there for improving environmental awareness?**

- **Does your company have a formal rewards scheme? If so, how does it operate? If not, how are environmental initiatives or ideas recognised?**

- **In terms of the environment, how responsible do you feel for your actions?**

- **How does your company encourage or support environmental practices in the supply chain?**

Table III. Coding scheme for content analysis

Category / Subject Matter	**Best (B) and Poor (P) Practices**	**Grounded Concepts**
Management support: Encouragement, providing an atmosphere which supports and motivates discussions. (Daily et al., 2007 and Wee and Quazi,2005)	(BP1) Environmental values inherent in top management	• Individuals at top level with particular concern for the environment • Corporate driven initiatives
	(BP2) Resource deployment	• Management allows time and provides means for environmental projects • Green Teams and cross functional environmental groups
	(PP1) Diminishing corporate level initiatives accountable for teams	• Only one individual is committed • Employees must solicit help and support • Original motivation for projects has vanished

	(PP2) Lack of conviction	• Green teams with little resource to operate efficiently leading to dysfunction • Haphazard target setting
Environmental Training: Relevance of training, employee satisfaction, sufficient training, opportunities for and methods of training. (Chinander, 2001 and Jabbour and Santos, 2006)	(BP3) Training as an integrated element of organisation`s activity	• Environmental learning including in Personal Development Plan • Employees learn to understand environmental impacts of their role • Opportunities for on-going education and growth are provided; learning is designed into work so that people can learn on the job.
	(BP4) Extensive and varied techniques for training	• Regulatory "induction day" training no considered sufficient • Staff selected for intensive international training courses • 'On the job' training courses
	(PP3) Only basic training to comply with ISO 14001 standard	• Minimum training strictly to meet ISO requirements • Training accepted as a paper only exercise
	(PP4) Training is not integral	• Environment not included in operations training • Training is offered only to those in selected functions
Communication: Types of communication networks, methods of suggestions, existence of cross functional teams. (Rothenberg, 2003 and Woo et al.; 2016)	(BP5) Effective information dissemination	• Continuous display of updated environmental news • Providing evidence which relates company activity to environmental impact
	(BP6) Two-way flow of information	• "Bottom up" initiatives meet no barriers • Opportunities for feedback • An atmosphere where discussion about greener methods is encouraged
	(PP5) Ineffective streams of interaction	• Both written and verbal messages vague on environment

	(PP6) Passive nature of information sharing	• Environmental information limited to posting policy on Health and Safety Notice board. • Environment seldom revised at formal/informal meetings
Rewards & Recognition: Reward schemes, informal and formal recognition. Direct rewards for actions. (Kaur, 2011 and Gonvindirajulu and Daily, 2004)	(BP7) Stimulating meaningful contributions	• Rewards closely linked to environmental issues • Appreciation and credit given for raising ideas
	(BP8) Creating green motivation among colleagues	• Generating ideas from all members of the organization • Networks at various levels of hierarchy
	(PP7) No explicit recognition for environmental improvements	• Distant links between environmental innovation and bonus
	(PP8) Unstructured reward schemes	• Environmental improvement actions not recognized in reward structures • Reward scheme not understood by employees
Employee Responsibility: Selection of individuals to become green champions, empowerment, motivation and awareness. (Ramus,2002 and Daily et al., 2007)	(BP9) Sense of individual responsibility ("our livelihood depend on our actions")	• A sense of personal duty among employees • If we do not "do the right thing" our business strategy becomes less viable
	(BP10) Sense of belonging (We`re all in this together)	• Closing the "them, not us" gap. • Employees held accountable for their actions
	(PP9) Ignoring relationship between job and environment	• No obvious link exists between activity and environmental impact
	(PP10) "It is not my problem"	• Lack of accountability for environmental issues

		• Environmental concerns are only for management
Employee Involvement: Individual involvement, group driven initiatives, social/environmental activities outside company. (Wee and Quazi, 2005 and Daily and Huang, 2001)	(BP11) Engagement in initiatives outside the company.	• Outside events to raise awareness in community • Ideas from outside the work place brought in
	(BP12) Participation in finding solutions to environmental issues	• Questioning current practice • Collective participation for a more equitable distribution of power in decision making
	(PP11) Employees not empowered	• Projects are hindered by lack of participation • Hierarchy takes precedence over involvement
	(PP12) Organisational conflict	• Frustration felt by colleagues appointed green leaders due to lack of cooperation with other staff members • Employees with no interest in green issues are selected as green leaders

Decision rules of coding for ensuring objectivity, validity and reliability:

A. Objectivity

- Identified categories which encompass independent criteria
- Categories are mutually exclusive and exhaustive (Weber, 1990)
- For ambiguous categories (e.g. employee responsibility vs. employee involvement) clear decision rules are defined. Employee responsibility is coded where individual accountability is acknowledged as opposed to involvement which is coded as a method to stimulate participatory behaviour.

B. Validity

- Coding and sub coding development is fine-tuned during the coding process when pre-determined categories were not exhaustive.
- Analysis is carried out by more than one researcher who performed the analysis separately

C. The researcher returns to the source of the data to present the result and gain agreement (Cantanzaro 1988)

D. Reliability

- The coding is established using due diligence (Miles and Huberman, 1994)
- The data collected resulted from consistent processes (Goetz and LeCompte, 1984) to ensure transparency and continuity

- Identified themes and categories should be internally homogeneous and externally heterogeneous, which means that no data should fall between two groups nor fit into more than one group (Krippendorff, 2004; Patton, 2002)

All cases are cross-examined

Table IV. Cross Case Summary of companies: level of best practice

Relevant KSF	**Best Practice**	**Family 1**				**Family 2**		
		B	C	D	G	A	E	F
KSF 1 – Management Support	1. Environmental values inherent in top management	**	**	***	n/a	*	*	*
	2.Resource Deployment	***	***	**	***	n/a	-	n/d
KSF 2 – Environmental Training	3. Training as an integrated element of the organization`s activity	***	***	n/a	***	*	*	*
	4. Extensive and varied training techniques in environmental issues	**	***	***	***	*	n/a	-
KSF 3 – Communication	5. Information Dissemination	***	**	**	***	-	*	-
	6.Two-way flow of communication	***	***	**	**	-	*	-
KSF 4 – Rewards & Recognition	7. Stimulating meaningful contributions	***	***	**	**	*	*	*
	8. Creating green motivation among colleagues	***	***	***	n/a	*	-	*
KSF 5 – Employee Responsibility	9.Accountability	***	**	**	**	-	*	*
	10.Sense of belonging	***	**	***	**	*	*	-
KSF 6 – Employee Involvement	11. Participation in sustainability related initiatives outside the company.	***	***	***	***	*	-	
	12. Participation in finding solutions to environmental issues	***	***	***	**	-		

Environmental Performance	13. Energy Conservation and Waste Reduction	***	***	***	***	*	-	-
	14. Green product planning and Manufacturing	***	**	**	**	*	-	-
	15. Product and Packaging Recyclability	***	***	***	***	*	-	-

*Note: n/a =not applicable (i.e. did not exist at this organization); n/d =no data available: - basic level; * low level; ** medium level; *** high level.*

Table V. Intervention Path Framework – supporting evidence inspired by deployment of and best practices operationalisation. (Case company code provided in brackets)

	Antecedent Variable	**Intervening Variables**		**Outcome Variable**
Path 1	Support from mgt and organisation - resource deployment	Integrated and varied training	Levels of individual responsibility	Improved environmental practices
Data which motivated this path included a "long term attitude" to environmental training where resource deployment was seen as an investment in the future of the organisation (G,D). Increasing levels of responsibility through training are considered to be essential for retaining skilled employees (B) whilst in turn increasing levels of responsibility for the environment.				
Path 2	Support from mgt and organisation - resource deployment	Two-way communication	Engagement in and outside of organisation	Improved environmental practices
Data which motivated this path was strongly related to the lack of top down management (B) and the importance of being open to information and ideas which stem from shop floor (B,C) Ideas which became reality and turned into events outside the organisation and/or projects to support ongoing environmental innovation to the sector.				
Path 3	Support from mgt and organisation - resource deployment	Rewards and recognitions	Engagement in and outside of organisation	Improved environmental practices
Data which motivated this path dependency from company C whose reward scheme led to engagement inside the plant. Recognition (D) was also seen to be closely linked to projects outside of the work environment. Overall engagement (D) had the benefits of providing more fertile ground for environmental practices at work.				
Path 4	Support from mgt and organisation - resource deployment	Two way communication and participative style	Solution finding	Improved environmental practices
Data which motivated this path was evident at (G) where employees were invited to provide solutions which would lead to better environmental outcomes.				

Figure 1. Intervention path framework of best practices