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Empirical Evidence on Environmental Management Practices

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Organizations are paying greater attention to the environmental impact of their business activities, as external stakeholders such as shareholders, customers and policy makers are increasingly demanding improved environmental performance from firms globally. Clean production and green products have become important issues to manufacturers as the International Organization for Standardization (ISO) has produced frameworks such as the ISO14001 series. These standards are intended to provide organizations with the elements of an effective environmental management system (EMS) that can be integrated with other management requirements and assist organizations achieve environmental and economic goals.

Firms have adopted environmental management systems (EMS) due to mounting government and industry pressures, yet little data exists in terms of the implementation of and practices within EMS. This paper aims to improve understanding and generate empirical data on firm activities in environmental management practices. This research will examine the nature and levels of environmental management practices within the industrial coatings industry by surveying the primary supply chain within an emerging market context.

This paper employs a quantitative cross-sectional survey approach to provide empirical data from a sample of firms which have implemented an EMS. The study is executed in an emerging market country allowing for international comparisons in similar contexts.

For the purpose of this study the population comprised suppliers of industrial coatings raw materials and industrial coatings manufacturers operating within the broader chemicals sector in South Africa. This emerging market country context provides a unique environment with opportunities to expand theory. A diverse sample frame ensured heterogeneity in the final sample representing several value chain activities in this industry. The survey was administered electronically to key players in this industry, with a 64 per cent response rate, resulting in a final sample of 84 respondents. The study results confirm that larger organizations and/or multi-nationals that are involved in export markets are committed to higher levels of EMS practices. These companies are securing their long-term survival by ensuring that they meet global sustainability objectives. In addition, these mostly private companies are reassuring internal and external stakeholders with their commitment to environmental protection.

Based on a descriptive statistical analysis it is encouraging to note that a significant number of companies in this study have shown commitment to advancing environmental sustainability and have implemented a structured EMS. This EMS formed part of their mission statements and management practices at the corporate, manufacturing and operations levels were implemented.

The results also indicate that the majority of organizations surveyed have, to some extent, incorporated environmental management into the strategic process of the organization, which was done by employing environmental experts, ensuring that the environmental function was housed by a separate department and was incorporated into the strategic planning process of the organization. EMS reporting in annual financial reports is also an encouraging trend. This research has contributed to the evolving field of environmental management and has provided valuable insights as to the nature in which firms are practicing EMS.

Since the majority of respondents in the present study are multi-national companies it may be beneficial to expand this research to other countries with different regulatory obligations, to be able to compare and contrast EMS practices.

Keywords: *Environmental management, business sustainability, manufacturing, operations, emerging market.*

Introduction

As a result of industrial globalization firms are looking for ways to achieve sustainable development by incorporating more environmentally friendly practices into their existing practices (Gonzalez, Sarkis & Adenso-Diaz, 2008). In the literature sustainability is mainly focused on the ecological dimension where it is perceived as a prerequisite for economic and social sustainability (Kersys, 2011). Based on a review of existing research in sustainable development, Bartkus and Grunda (2011) analyze various business sustainability evaluation models to address the issue of availability of information to evaluate sustainability.

Organizations are paying greater attention to the environmental impact of their business activities, as external stakeholders such as shareholders, customers and policy makers are increasingly demanding improved

environmental performance from firms globally (Banjeree, 2001). Environmental issues have been gaining higher priority in a number of industries due to market pressures and increasing environmental regulation. Clean production and green products have become important issues to manufacturers (Padma, et al., 2008). Furthermore the International Organization for Standardization (ISO) has produced frameworks such as the ISO14001 series that provide generic requirements for business to adopt, in addressing various aspects of environmental management (ISO, 2009). International standards covering environmental management are intended to provide organizations with the elements of an effective environmental management system (EMS) that can be integrated with other management requirements and help organizations achieve environmental and economic goals (ISO, 2009). An EMS provides a systematic framework for assisting organizations to manage short-term and long-term impacts of their products, services and processes on the environment (Sebhatu & Enquist, 2007). In addition EMS's provide standards against which organizations can be assessed with regard to the environmental effects of their processes, their compliance with applicable laws and regulations, and their ongoing improvement in these respects.

The adoption of an EMS may be due to a number of reasons that include: competition, supply chain pressures, regulatory policy, or seeking improved environmental performance, thereby addressing the needs of both internal and external stakeholders (Gonzalez et al., 2008).

Organizations which adopt and implement environmental sustainability need to identify how their organization fits into the larger ecological and economic environment and identify actions required for their survival. Managers have realized the need for integration of environmental requirements within the firm's strategy. Research indicates that many firms have developed and implemented environmental mission statements, some have included environmental reports in annual financial reports, and executive and board positions have been designated for environmental specialists. These initiatives certainly point to the importance of environmental sustainability at the strategic decision-making level of organizations (Sarkis, 2001; Sarkis, et al., 2006).

Research problem: Due to mounting government and industry pressures, firms have adopted EMS, yet little data exists in terms of their implementation and practices.

Research purpose and aim: The paper aims to improve understanding and generate empirical data on firm activities in environmental management practices. This research will examine the nature and levels of environmental management practices within the context of the industrial coatings industry by surveying the primary supply chain in an emerging market context.

Research methodology: This paper employs a quantitative cross-sectional survey approach to provide empirical data from the sample of firms which have implemented the EMS. The study is executed in an emerging market country allowing for international comparisons in similar contexts.

Theoretical overview

Environmental uncertainty and the way in which firms react are important dimensions which affect an organizations'' performance management system (Gimzauskiene & Kloviene, 2010). External pressures such as legislation and public concern, as well as market opportunities arising from environmental concerns, have compelled organizations to integrate environmental issues into their strategic planning processes (Banjeree, 2001).

Research suggests that the adoption of the EMS can provide benefits to organizations, which include improvements in productivity, competitiveness, business profitability, a "green" image and can be achieved through two basic objectives (González et al., 2008):

(1) Reducing the amount of waste generated; and
(2) Maximizing the efficiency of the resources employed (by means of recycling, reuse or any other type of reclamation activities).

Due to mounting government and industry pressures, firms have decided to formalize their environmental management processes in order to monitor and improve their procedures, and to become audited and certified with their respective scheme. Organizations of all types have recognized the need to conduct regular internal and external audits to show compliance to their EMS activities. Compliance to auditing protocols shows commitment by the organization to advancing environmental protection (Dahlmann,et al., 2008; Zutshi & Sohal, 2004).

Having a certified EMS provides a supportive environment for the adoption of other environmental practices. If organizations wish to see their environmental management programs grow, certified EMS such as ISO14001 are good mechanisms to support this growth. Delmas & Montiel (2008) add that environmental management standards feed on each other and that previous standards accelerate the adoption rates of subsequent ones. Zutshi & Sohal (2004) agree and add that organizations that already have existing management systems in place such as ISO9001, Quality Management System (QMS) or OHAS18001, Occupational Health and Safety Management System (OHS) find it easier to implement additional systems such as ISO14001 and Responsible Care® (RC). RC is the world's leading voluntary industry initiative, run in 53 countries whose combined chemical industries account for nearly 90% of global chemicals production. RC assists the industry to operate safely, profitably and with care for future generations. Through the sharing of information and a rigorous system of checklists, performance indicators and verification procedures, RC enables the industry to demonstrate how its health, safety and environmental performance has improved over the years, and helps develop policies for further improvement (Responsible Care®, 2005). These standards structure the organizations responses to environmental issues and also provide verification through internal and more importantly external auditing protocols (Poksinska, Dahlgaard & Eklund, 2003; Zeng, Tian & Shi, 2005).

Previous research (Padma *et al.*, 2008) suggests that multi-national firms, due to their exposure to international

markets, have more mature quality methods and systems implemented when compared to national (local) organizations. These export oriented organizations perform better as they cater to foreign markets and have diverse obligations to meet. Wu, Chu & Liu (2007) concur with Padma *et al.* (2008) on this issue and report that export oriented firms and multi-nationals which face supply chain pressure from other multi-national firms are more likely than domestic focused firms to adopt environmental management systems (EMS). Additionally Faulkner, Carlisle and Viney (2005) and Dahlmann *et al* (2008) find that larger companies are more responsive to environmental issues due to these organizations being more exposed to external pressures. These companies also have a larger resource base from which to address these issues. Company's environmental response is also determined by the size of the organization in terms of its market reach, i.e. whether the organization is locally based or whether it is involved in import/export trade and based in more than one country, i.e. a multi-national organization. Moreover the role of the manufacturing organizations with respect to environmental practice and strategies has evolved over time according to Sarkis (2001) and is at the forefront of organizations seeking to address the issue of environmental sustainability.

This opposed to the early 1970's when organizations were under a command-and-control mentality that required them to comply with regulations and legislation. Manufacturing strategies of today are influenced by environmental pressures and practices including the spectrum of process issues from prevention and reduction to recycling and disposal. In addition Sarkis (2001) believes that the linkage across the production chain from product and process design to procurement, production and logistics, will require more complete control systems and practices, to ensure responsiveness to environmental issues. As a result of these changes, industries such as chemical industry have more well-developed environmental strategies due to the stricter legislation and changes in environmental legislation impacting this industry.

Managerial perceptions reflect that environmental issues are a source of business opportunity and could lead to competitive advantage. Environmental issues are forcing senior corporate executives to rethink how they should conduct their businesses. This involves not only an evaluation of the environmental impact of existing products and production processes, but also an assessment of environmental liabilities and opportunities throughout the corporate value chain (Quazi, 2001). Dahlmann *et al* (2008) agree that formal managerial structures and processes associated with strategic decision-making in firms are viewed as indicative of the state of corporate environmental management practices within the organization.

Research on EMS by Sarkis (2001), Delmas & Montiel (2008), Theyel (2000) and Faulkner *et al* (2005) suggests that environmental management must be incorporated into the long-term strategic process of the company in order to be effective. This constitutes employing qualified environmental specialists, ensuring that the environmental function is housed by the separate department and is incorporated into the strategic planning processes of the firm.

EMS includes recycling, remanufacturing, and reuse, where these practices are focused on internal and external process capabilities. Research finds that developing and integrating internal recycling processes may require significant investment in technology. Some organizations have flourished with the implementation of newer closed-loop type process technologies, where the aim of closed-loop or "zero-pollution" is to reuse wastes or by-products within the manufacturing system. The success of a closed-loop manufacturing system requires both prevention (e.g. substitution) and reuse capabilities (Sarkis, 2001).

Product strategy (Sarkis, 2001) within a manufacturing function is most closely associated with design for the environment (DFE) and life cycle analysis (LCA) issues. Product and materials flexibility is necessary for both product development and materials substitution. These practices should be adopted not only for environmental reasons, but also for competitive reasons, as product life cycles will continue to decrease as product customization increases. Sarkis (2001) adds that designing environmental 'benign-ness' into products will be a major ingredient for the successful introduction of these products.

Overall organizations have shown commitment to advancing their responses to environmental issues in many forms. However, critical to their survival is the integration of EMS and practices at the strategic, manufacturing and operations level. Organizations need to develop internal strategies to firstly identify all possible waste streams at the manufacturing level and secondly and more importantly develop new products and use new raw materials to ensure that harmful environmental impacts are minimized.

Research Methodology

For the purpose of this study, the population comprises suppliers of industrial coatings raw materials and industrial coatings manufacturers operating within the broader chemicals sector in South Africa, an emerging market country context. Emerging economies are unique environments that offer the ability to obtain fresh insights to expand theory and our understanding of it by incorporating more contextualized considerations (Bruton, Ahlstrom, & Obloj, 2008). The research population was drawn from the South African Paint Manufacturers Association (SAPMA) sampling frame and represents not only manufacturers within this sector, but also traders who purchase goods from different suppliers and sell on to their customers. SAPMA has identified various suppliers and 42 different manufacturers operating within the industry. Consequently this diverse sample frame ensured heterogeneity in the final sample representing several value chain activities in this industry. The selection criterion was restricted to suppliers that are supplying raw materials to the industrial coatings manufacturing sector and who have implemented EMS where eligible.

The survey was administered via electronic communication to key players in this industry, with a 64 per cent response rate, resulting in a final sample of 84 respondents.

First the survey collected descriptive data to establish the typical organizational profile that has implemented and practices the EMS. The content part of the questionnaire was developed and based on existing conceptualizations of EMS. All items have been developed on the basis of the literature review and reflect core themes as gleaned from previous research findings on this topic. Fifteen variables were identified in attempt to assess the level of responsiveness to environmental issues as well as the practices as a result of EMS implementation. Questions were measured on a 1-5 Likert scale where '1' indicates respondents 'strongly disagree', to '5' where respondents would 'strongly agree' with the statements.

Pilot testing of the instrument was conducted to affirm that the questions capture the key concepts of EMS (Dhurup, 2003), and was tested on fifteen members of the sample, covering both suppliers and manufacturers. The pilot test allowed for adjustments regarding vagueness or ambiguities to be addressed. Notwithstanding, as a result of the pilot test, content validity had been established, the reliability of the instrument was tested. For total items Cronbach's Alpha coefficient of reliability was 0.932 based on standardized items indicating relatively high reliability (Nunnally, 1978).

Results of empirical research

Based on sample characteristics, descriptive analysis (see table 1) reveal that most of the firms are in the 41 to 60 year age bracket, suggesting that these are mature established organizations. This is further corroborated in terms of the number of employees, where close to 80% of firms have more than 50 employees, as well as by the annual turnover where 79 per cent of the firms have more than 100 million revenues. Moreover these firms tend to be mostly (79 per cent) multi-nationals and 68 per cent of them are privately owned.

Table 1

Sample firm characteristics

Variables	percent analysis
Company age:	
11-20 years	12
21-40 years	15
41-60 years	64
61-100 years	8
Number of employees:	
Small (less than50 employees)	20
Large (more than50 employees)	79
Turnover last Financial year:	
less than R100 million*	24
more than R100 million	75
Is the company a multi-national?	
Yes	79
No	21
Is the Company a private or public company?	
Private	68
Public	32
Has the company conducted an external legal audit of its environmental impacts?	
Yes	60
No	40

**R7= 1 US$ (approxiamate)*

These results confirm that larger organizations and/or multi-nationals which are involved in export markets are committed to higher levels of EMS practices. These companies are securing their long-term survival by ensuring that they meet global sustainability objectives. In addition these mostly private companies are reassuring internal and external stakeholders by their commitment to environmental protection. This is consistent with the findings of Faulkner et al (2005) and Dahlmann et al (2008).

Figure 1 indicates the percentages and types of certified environmental management systems that are currently in place for this sample of firms. It is interesting to note that only 60 per cent of the sample had carried out the external legal audit of its environmental impact.

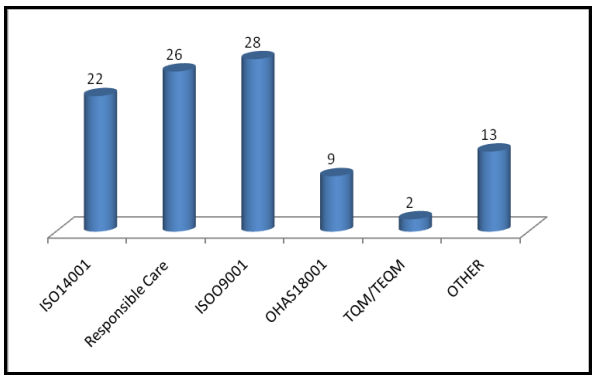

Figure 1. Certified environmental Management Systems Implemented

Table 2

Descriptives for environmental management system (EMS) practices

Variable	mean	std. dev.
Integration of EMS into corporate organizational strategy	4.12	0.97
EMS policies and mission statements in place	4.10	1.07
EMS or Corporate Social Responsibility reporting in Annual Financial Reports	3.60	1.19
Environmental Department as a separate organizational function of the organization	3.61	1.27
Employed senior level environmental experts to coordinate EMS throughout the firm	3.50	1.32
Risk assessments conducted to identify all possible waste streams	4.25	1.25
Modified production processes by substituting the use of non-hazardous materials	4.16	1.30
Developed or modified production processes in order to reduce the amount of waste generated	4.16	1.20
Implemented systems to recycle waste that is generated from production processes	3.89	1.29
Use recycled materials in production processes wherever possible	3.74	1.28
Investment in research and development for cleaner products and technologies are implemented	4.10	1.25
Products are evaluated based on their environmental impact	4.15	1.09
Design for the environment (DFE) and life-cycle analysis (LCA) are implemented	3.47	1.43
Hazardous materials are substituted to lessen environmental impact of products produced	4.15	1.25
Supplier innovation initiatives help to develop substitute materials (hazardous to less/non-hazardous)	3.95	1.10

Table 2 indicates the descriptives for the EMS variables. Based on the relatively high mean scores (all mean scores are well above the mid-point average of the Likert scale) it seems that these firms are successfully employing EMS practices. It is encouraging to note that a significant number of companies in this study have shown commitment to advancing environmental sustainability by implementing a structured EMS vis-à-vis their mission statements and further by implementing management practices at the corporate and also manufacturing and operations level.

The results also indicate that the majority of organizations surveyed have to some extent incorporated environmental management into the strategic process of the organization and this was done by employing environmental experts, ensuring that the environmental function is housed by the separate department and is incorporated into the strategic planning process of the organization. EMS reporting in annual financial reports is an encouraging trend. Risk assessments seem to have been conducted to identify all possible waste streams, and even production processes have been modified by substituting the use of non-hazardous materials as well as to reduce the amount of waste generated. Investment in research and development for cleaner products and technologies signals strong commitment to EMS. This is manifested where not only are products evaluated according to their environmental impact but DFE and LCA practices have been implemented.

Conclusions

The empirical results ensuing from this study coincide with existing research where Dahlmann *et al* (2008) and González *et al* (2008) find that larger firms in more environmentally impactful industries (such as chemical industry) have a greater tendency to implement formal environmental management systems. Moreover these results reaffirm the findings of Padma *et al* (2008) and Wu *et al* (2007) who found that multi-national or export-oriented firms have placed a greater emphasis on environmental management by adopting EMS to respond to global environmental issues.

Certifications on these systems enhance organizations'' image as being environmentally responsible. Such practices reassure external stakeholders such as customer, government, NGO's and other interested parties that environmental sustainability is of great concern to this industry. It is encouraging to note that organizations operating in this industrial sector of the economy are doing so in a responsible manner. These organizations have identified the environment as a key future strategic area and are implementing environmental management into the core processes of business decision-making to ensure that continuous sustainable improvements are achieved (Faulkner et al, 2005).

The empirical findings of the present study coincide with the studies of Dahlmann *et al* (2008), Zutshi & Montiel (2004), González *et al* (2008) and Padma *et al* (2008) who report that implementing the EMS such as ISO14001 is beneficial to organization, since environmental management practices provide organizations with a systematic approach to addressing environmental issues. Such commitment demonstrates that chemical industry, once believed to be a leading polluter globally, is taking steps to change public perception by leading the way and responding positively to addressing global environmental issues. The overall high levels of EMS, as displayed in our sample of firms, are consistent with the findings of Banjeree (2001) who identified that firms in chemicals industry have developed environmental strategies due to this industry facing stricter legislation and more rapid changes in environmental legislation.

Resonating with studies by Sarkis (2001), Delmas & Montiel (2008), Theyel (2000) and Faulkner *et al* (2005) this study has found that firms have, to a large extent, implemented EMS at the strategic decision-making level, and are environmentally conscious by being responsive to environmental issues. These firms are implementing EMS practices at the manufacturing and operations level and are benefitting from waste minimization and generating efficiencies in cost reduction, through continuous improvement methods.

In conclusion this research has contributed to the new and evolving field of environmental management and has provided valuable insights as to the nature in which firms are practicing EMS. It is encouraging to note that management frameworks such as ISO14001 are proving to be valuable tools to structure organizations' response to environmental issues. These initiatives show that the majority of companies surveyed believe the environment to be a key strategic area within their industry and the global economy.

The study is not without limitations and the data represents only larger companies due to the lack of response from smaller companies. It seems that inline with the findings of Dahlmann *et al* (2008), these companies already interested in environmental management were more willing to participate in the survey and the findings could have been shaped by this self-selection bias. Similar to the work of Dahlmann *et al* (2008) the analysis above is based on a snapshot of the environmental practices at a point in time. Future longitudinal research could be conducted to further analyze the evolution of environmental management practices within these companies and industry over time.

Since the majority of respondents in the present study are multi-national companies it may be beneficial to expand this research to other countries with different regulatory obligations, to be able to compare and contrast EMS practices. The rise of management throughout the transition economies of Central and Eastern Europe (CEE), the newly independent states (NIS) of the former Soviet Union, and Africa has fundamentally transformed these economies, and caught worldwide attention (Ireland, Tihanyi & Webb, 2008; Peng, 2000). This is particularly apparent in institutional environments characterized by a high level of ambiguity, uncertainty, and turbulence, such as in economies with a recent history of central planning, making them a fascinating laboratory for scholars interested in the interface between institutions and behavior (Urban, 2010; Welter and Smallbone, 2011).

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Aplinkos valdymo praktikos empirinis pagrindimas

Santrauka

Mokslinėje literatūroje analizuojant patvarumą, daugiausiai dėmesio sutelkta į ekologinius dydžius, kurie suvokiami kaip būtina sąlyga ekonominiam ir socialiniam patvarumui (Kersys, 2011). Remdamiesi patvarios plėtros tyrimu, Bartkus ir Grunda (2011) išanalizavo įvairius verslo patvarumo įvertinimo modelius, kad būtų galima įvertinti informacijos galimumo problemą.

Organizacijos vis daugiau dėmesio skiria aplinkai, kuri daro įtaką verslui, nes išoriniai pajininkai (akcininkai, vartotojai ir politikai) vis daugiau reikalauja, kad įmonės pasauliniu mastu gerintų su aplinkosauga susijusius veiksnius. Švari gamyba ir žali gaminiai tapo svarbūs gamintojams, nes Tarptautinė standartizacijos organizacija (plg. angl. International Organization for Standardization - ISO) išleido nemažai reglamentų, tokių kaip ISO14001, kurie yra skirti aprūpinti organizacijas efektyvaus aplinkos valdymo sistemos elementais (plg. angl. environmental management system - EMS), ir kurie gali būti integruoti kartu su kitais valdymo reikalavimais, kad padėtų organizacijoms pasiekti aplinkosaugos ir ekonominių tikslų.

Įmonės pritaikė aplinkos valdymo sistemas (EMS) dėl didėjančio vyriausybinio ir pramoninio spaudimo. Tačiau vis dar turima per mažai duomenų apie EMS įdiegimą ir praktinį panaudojimą. Šio darbo tikslas - pakeisti supratimą ir pateikti empirinius duomenis apie praktinę įmonės veiklą aplinkos valdymo metu. Šiame tyrime siekiama atskleisti aplinkos valdymo praktikos prigimtį ir lygius pramoninių dangų pramonėje, stebint pradinę tiekimo grandinę kylančios rinkos sąlygomis.

Šiame darbe panaudotas kiekybinis skersinio pjūvio stebėjimo metodas siekiant pateikti empirinius duomenis iš pavyzdžio, kurį sudaro įmonės, kurios įdiegė EMS. Darbas atliktas kylančios rinkos šalyje, todėl galima atlikti tarptautinius palyginimus.

Šiame darbe tiriamųjų skaičius buvo pramoninių dangų žaliavų tiekėjai ir pramoninių dangų gamintojai, dirbantys dideliame Pietų Afrikos chemijos sektoriuje. Ši kylančios rinkos šalis suteikia unikalią galimybę tirti aplinką ir papildyti teoriją. Įvairiapusė pavyzdžio aplinka užtikrino galutinio pavyzdžio nevienalytiškumą, pavaizduojant keletą vertės grandinės veiklų šioje pramonėje. Stebėjimas elektroniniu būdu paskirstytas pagrindiniams šios pramonės veikėjams, atsiliepimus sudarė 64 %, o galutinius 84 respondentų. Tyrimo rezultatai patvirtina, kad didesnės ir/ar daugianacionalinės organizacijos, kurios dalyvauja eksporto rinkose, yra įsipareigojusios aukštesniems EMS. Šios kompanijos užtikrina savo ilgalaikę veiklą užtikrindamos, kad jos atitinka globalinio patvarumo tikslus. Be to, dauguma privačių kompanijų dar kartą patikina vidaus ir išorės tarpininkus savo įsipareigojimais aplinkos apsaugai.

Remiantis aprašomąja statistine analize, galima paminėti, kad dauguma šio tyrimo kompanijų parodė, kad jiems svarbūs įsipareigojimai dėl pažangaus aplinkos patvarumo ir įdiegė struktūrinę EMS. Ši EMS, suformuota kai jų misijos konstatavimo ir valdymo praktikos dalis, buvo įdiegta koorporaciniame gamybos ir valdymo lygiuose.

Remiantis iš dalies aukštomis reikšmėmis (visos reikšmės buvo gerokai didesnės nei Likert-o skalės vidurkis), atrodo, kad tos įmonės sėkmingai naudoja EMS. Galima paminėti ir tai, kad dauguma šiame tyrime dalyvavusių kompanijų, dar prieš jų numatytą veiklą diegdamos valdymo praktiką koorporaciniu, taip pat gamybiniu ir valdymo lygiu, įsipareigojo pagerinti aplinkos patvarumą įdiegdamos struktūrinę EMS

Rezultatai taip pat rodo, kad dauguma stebėtų organizacijų iki tam tikro lygio įtraukė aplinkosaugos valdymą į organizacijos strategijos procesą, įdarbindamos aplinkosaugos ekspertus ir garantuodamos, kad aplinkosaugos funkcijas vykdo atskiras skyrius. Visa tai buvo įtraukta į organizacijos strateginio planavimo procesą. EMS pranešimai kasmetinėse finansinėse ataskaitose taip pat paminėtina, kaip viena iš skatinančių krypčių. Šis tyrimas svarbus kylančios aplinkosaugos valdymo sričiai, nes atskleidė ir pateikė vertingų įžvalgų apie gamtą, kurioje įmonės naudoja EMS.

Kadangi dauguma respondentų šiame darbe yra daugianacionalinės kompanijos, gali būti naudinga atlikti šį tyrimą ir kitose šalyse, kuriose kitokios reguliavimo sąlygos. Atlikus tyrimą būtų galima palyginti ir sugretinti EMS praktiką.

Taigi apibendinant reikėtų paminėti, kad tokios valdymo sistemos kaip ISO14001, įrodo, kad yra nemažai būdų siekiant struktūrizuoti organizacijos atsaką į aplinkos problemas. Šios iniciatyvos parodo, kad dauguma stebėtų kompanijų tiki, kad aplinka yra pagrindinė strateginė sritis jų pramonėje ir pasaulinėje ekonomikoje.

Darbas turi apribojimų, nes duomenys atskleidžia kas daroma didesnėse kompanijose. Mažesnės kompanijos nedalyvavo tyrime. Atrodo, kad kartu su Dahlmann ir kitų (2008) gautomis išvadomis, matyti, kad tik susidomėjusios tyrimu kompanijos buvo linkusios dalyvauti stebėjime, todėl galima manyti, kad tai galėjo šiek tiek lemti gautų išvadų šališkumą. Panašiai kaip Dahlmann ir kt. (2008) darbe, anksčiau pateikta analizė yra pagrįsta aplinkosaugos praktika per tam tikrą laiko tarpą. Būsimas išilginis tyrimas galėtų būti atliktas siekiant toliau analizuoti aplinkos valdymo praktikos evoliuciją šiose kompanijose ir pramonėje bėgant laikui.

Kaip jau minėta anksčiau, kadangi dauguma respondentų šiame darbe yra daugianacionalinės kompanijos, naudinga šį tyrimą atlikti ir kitose šalyse, kuriose yra kitokios reguliavimo sąlygos, nes valdymas pereinamojo laikotarpio šalyse: Centrinėje ir Rytų Europoje, naujose nepriklausomose valstybėse (anksčiau buvusiose Sovietų Sąjungos sudėtyje), Afrikoje ir kitose, iš pagrindų pakeitė šias šalis. Jos susilaukė pasaulio mokslininkų dėmesio (Ireland, Tihanyi ir Webb, 2008; Peng, 2000). Tai ypač išryškėjo analizuojant įstaigų aplinką, kurią apibūdina aukštas dviprasmiškumo, neužtikrintumo lygis ir neramumai, ypač šalyse, turinčiose dar neseną centralizuoto planavimo istoriją. Jos yra nuostabi „tyrimų laboratorija“ mokslininkams, besidomintiems sąveika tarp institucijų ir elgesio (Urban, 2010; Welter, Smallbone, 2011).

Raktažodžiai: *aplinkos valdymas, verslo patvarumas, gamybos valdymas, kylanti rinka.*

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