

# ENVIRONMENTAL MANAGEMENT ACCOUNTING PRACTICES IN SRI LANKAN PUBLIC LISTED COMPANIES

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## **Abstract**

***Purpose*** - The main purpose of our study is to provide basic understanding about Environmental Management Accounting practices in Sri Lankan Public Listed Companies. This research was basically conducted to identify what are the existing Environment Management Accounting (EMA) practices in Sri Lankan public listed companies including different sectors and industries such as Manufacturing, Hotel, and Agriculture etc. Further we emphasized on improvements of practices; barriers to implementation and giving solutions for those barriers within the Sri Lankan context.

***Design / Methodology / Approach*** – This study was adopted both qualitative and quantitative approach. Data was collected mainly through a questionnaire distributed among the hundred Sri Lankan listed companies. The results of the questionnaire were triangulated by conducting pilot survey with sample of four companies which were selected from Public Listed Companies in Sri Lankan. A systematic literature review was conducted to support the study.

***Key Words*** - Environmental Management Accounting, Sri Lankan public listed companies, confines, Benefits of EMA, Barriers

## **1. Introduction**

Environmental Management Accounting (EMA) can be defined as the generation, analysis and use of environment-related financial information to support business decision-making (Bartolomeo et al., 2000). When we consider the history of this practice, Environmental accounting emerged in the 1970s as a result of an increase in environmental awareness and concerns about social and environmental well-being. Up to now we could see these factors are being used in present businesses in Sri Lanka like accounting practices such as accounting for energy, material accounting, carbon accounting, environmental capital budgeting, activity-based costing, environmental impact assessment, life cycle analysis, bio-diversity accounting, etc.

As well as the financial accounting, Environmental Management Accounting is readily available through annual reports, sustainability reports and other reporting media. Now a day's environment has become a very crucial issue not only for personal life but also for business life. If business organizations can adopt their practices in order to environmental friendly way they able to get competitive advantages than others. Hence, environmental movements and environmental reporting practices done by different organizations all over the world to gather great momentum in recent years. Thus, stakeholders demand social and environmental information which affects to the organization's community in addition to the conventional financial reporting.

While only a few studies are available on developing countries, most of EMA practices have focused more on developed countries (Herzig et al.2012, Gunaratne & Lee, 2015). As per the research findings of Rajapakse (2008) majority (45%) of the Sri Lankan stakeholders has an awareness of environment management activities of business organizations. But they have highlighted the barriers to use EMA practices such as lack of managerial knowledge, huge cost of process and mainly on profitability. This research mainly attempts to discover whether EMA has been implemented and whether the environment is considered in decision making within listed companies in Sri Lanka .Further we tried to identify how to overcome the barriers to implement and advantages of implementation of EMA activities. As a new concept majority of people do not know the real idea, values and opportunities of this concept. So EMA has become a significant and important topic to build a discussion among researchers.

### **Problem Statement**

Most of the companies don't consider about environmental hidden cost. Companies always account for visible and financial costs and they try to save the cost and improve the benefits. Importance of this research is to identify different types of Environment Management Accounting practices in public listed companies in Sri Lanka and to what extent they are adopted. Also, the study is aimed to identify how this eventual knowledge supports decision making in companies towards better environmental performance.

## **Research Question**

To what extent Environment Management Accounting practices are adopted in Sri Lanka?

## **Research Objectives**

The purpose of this research is to identify the Environmental Management Accounting (EMA) practices in Sri Lankan organizations. From this research we tried to understand the level of awareness about EMA practices in Sri Lankan organization. This can be identified as main objective. From this we analyzed the environmental accounting within management accounting or financial accounting that could support in decision making in companies towards better environmental performance.

In addition to our main objective, eventually we identified what are the areas of EMA, EMA practices which business organizations carried out, benefits after implementing EMA practices in organizations and barriers to implement EMA.

## **Significance of the research**

EMA concept is a challenge faced by the all business organizations. It could be used to identify the methods that used to implement these systems, results of the process, measurements, barriers and the solutions for lack of implementation. Then it would helpful to identify the opportunities to use these concepts and create value creation to the entities. Environmental Management Accounting (EMA) can likely support decision making in companies towards better environmental performance today. Through structured cost assessment that support effective decision making in companies towards better environmental performance.

## **2. Literature Review**

When considering the adoption of Environmental Management Accounting practices in Sri Lanka, study about the barriers to EMA practices which faced by Listed companies (large scale) cannot be neglected. Since Sri Lanka is a developing country, such a new and matured concept is infeasible to implement even in large organizations.

In our literature review we got an opportunity to understand the barriers that faced by small and medium sized businesses in North Carolina. According to Allison and John (2010) the common obstacle mentioned by all SMEs are focused on the cost of implementing environmental practices. In addition to that lack of time, legal or regulatory barriers, unavoidable company operations and procedures, lack of knowledge were the main barriers. And also in their research they have recommended some solutions for these issues such as better access to information that helps to decrease the environmental impact, incentives to implement more environmental practices and projects etc.

According to Suleiman and Ahmad (2011) not only barriers but also a growing body of research has been done on pressures that influence manufacturing companies in Malaysia to adopt EMA

practices The research highlighted that there are three major perspectives concerning the pressures namely, Coercive Isomorphism - in response to political influence or/and legitimacy Problems; Mimetic Processes - a result of standard responses to Uncertainty; Normative Pressures - stems from professionalism (Education & professional networking).

The environmental accounting practice has received specific attention in light of the progressive social awareness towards the damage to the environment, due to the organization's productive activities. Bracci (2013) concentrated on the accounting system for the financial reporting as the privileged gateways to be involved in the environmental awareness of a firm. It identifies the accounting potential of a firm to respond to the environmental issues in light of the rooms left open through the normative and IFRS prescriptions. So with the barriers and pressures, ISO 14001 certificate and EMA Standards emphasise the importance of implementation of those practices.

This is verified in the research done by Ramlil, Sobre and Alam, (2013). According to their survey ISO 14001 certified organizations in Malaysia had extensively implemented EMA Practices. There is an awareness among key players in implementing environmental practices into organizations' operation might be beneficial to them in order to overcome the problem of traditional management accounting which fails to incorporate environmental hidden costs. Significant positive relationship between environmental management accounting practices and competitive advantage and, organizational performance was discovered in this study.

Bartolomeo et al. (2010) suggested in their comprehensive study that even though many companies claim some environmental management accounting activity, this often represents only a few experimental projects rather than systematic and comprehensive implementation such as accounting function was not central to many environmental management accounting activities, Mere identification of costs alone is not necessarily sufficient to make pollution prevention a financially attractive activity, Conventional management practices not being able to identify all the internal costs resulting from emissions to the environment. Environmental management accounting is often complementary to other current trends in business and accounting.

Khalid and Lord (2012) also proved the viewpoint of Bartolomeo et al. (2010) stating that they are using environmentally considerate operations in some cases; financial implications are always the major focus. Companies are willing to implement EMA related tools as long as the consequences for them are financially beneficial. Therefore they recommend the Malaysian government provide assistance and clear regulations, customers not to trade off their environmental requirements in order to obtain cheaper materials or goods from companies and they should insist on environmentally safe processes and products, financial institutions to ensure that they only approve environmentally viable projects and capital investments etc....

Bartolomeo et al. (2010) argued that there is no more uses the EMA practices due to rapid diffusion and EMA studies highly focus on developed countries .Furthermore they have Identified three benefits which affects to management decisions of a company Such as

Compliance Efficiency (ensuring compliance with external environmental policies ),Eco Efficiency (support to reduce cost and environment impacts via more use of resources efficiently.) and Strategic Positioning (strengthen an organization's long term strategic position).But they did not consider about the systematic changes in the future adoption of EMA .Simultaneously they did not analyse the influence of the national culture on the adoption of this concept.

Cullen (2010) argued that there should be wide empirical studies in this area, though the environment accounting & he has concluded that environmental Management Accounting can likely support effective decision making in companies towards better environmental performance. Accountants and managers may not accept the fact that projects that are violation of critical ecological functions. Managers who are more environmentally inclined will persuade clients to accept responsibility for a bigger share in their participation and this researcher an attempt to point out that there is a need for a great deal too how green accounting is carried out. But they did not focused the barriers of the green concept and the effects of this concept to not only the organization and but also to the other fields.

Christine and Zanta (2005) focused on the influence of environment Management Accounting and Sustainability Management Accounting for introduction of the EMA methodology conceptual approach was used, which includes training materials and training seminars, company case studies, further dissemination of EMA. Therefore, we see EMA provides a good chance to integrate environmental objectives into existing common business systems. There has been identified an issue in this research article that is how separately identify categories of environment cost. A solution has been provided in this article for the separation of Environment cost. But it has given a solution as Air and Climate (Energy), Waste Water, Waste Soil & Ground water, Noise, Landscape, Environment Management cost. But whole research was focused on positive impact of Sustainability Management Accounting but it did not address the negative impact and costs relating to the sustainability accounting.

Robert and Curtis (1996) argued that when organizations published their sustainability policies it will be affected on the positive impact on market price. It proved that the interest of investors on Environment Management of Companies in recent times. Due to this research the price become positively affected by better public available information. The end result was increase total financial performance of companies. But they have reached this conclusion only based on information of Subsidiary Companies.

Hendro, Ferreira and Moulang (2010) suggested that EMA helps organizations to recognize the environmental effects of their operational activities. The role of strategy is also explored, and includes the direct effects of strategy on EMA use and direct and indirect effects of strategy on innovation. The correlation analysis suggests that it is likely that EMA use has a positive effect on process innovation. However, some doubt is placed on this finding in the PLS structural analysis. The correlation between EMA use and product innovation is found not to be significant, which is likely to be driven by the small magnitude of the effect. Therefore the results suggest that innovation is a potential outcome arising from EMA use in that it can impact on the extent to which an organization engages in process innovation. Even though the results suggest that

EMA use does not affect product innovation and provide weak support for the effect on process innovation, there are still other worthwhile benefits that an organization may experience from EMA use. But it has not address the opportunity to investigate other determinants of EMA use such as legal requirements, stakeholder pressure and the organization's attitude towards environmental issues.

Schaltegger, Gibassier and Zvezdov (2013) paper analyzed the initially posed question whether EMA research has developed as a discipline and become main stream with a bibliometric analysis of EMA publications. Despite disruptions and the changing gap between the number of journal papers and other publications, a correlation analysis provides a correlation factor of 0.78 (level of significance 0.05), suggesting a strong correlation in the number of academic and other publications for the period between 1973 and 2011. Major observations is that only 27 articles have one or more citations in ISI WoK, of which only six papers have ten or more citations. This may be an indication that EMA is still a research area which is not very well linked into other, more conventional, and often cited research areas. Another key observation is the geographical spread of the authors who have influenced the literature as well as the countries where the EMA discussion is flourishing: the UK, Germany and Australia. This shows that the topic of environmental and sustainability accounting is mainly discussed in a small part of Europe and Australia.

Sharma, Mistry and Low (2014) argued that incorporating environmental management accounting systems to use as a basic structure for achieving sustainable development practices, and guiding decision-making within the organization in order to gain legitimacy from the wider society. However, as the interviews showed, small-medium organizations' management accountants place lesser importance on achieving sustainable development, and this is evident through the types of practices the management accountants engage in. The roles of management accountants in smaller organizations seem to be dedicated around the additional roles of management accountants. The survey responses and interviews both recognized the limited use of sustainable development reporting and benchmarking.

This research is limited as it is only an exploratory study with a small sample of small-medium and large businesses in New Zealand. There is a need for greater acceptance by senior management of the role management accountants could play in accounting for sustainable development. The literature revealed the use of management accounting tools such as environmental management accounting systems, yet the survey and interviews showed that management accountants currently do not use such tools to achieve sustainable development goals for their organizations. Employee retention is also advocated by the literature through sustainable development practices; however, their study could not find support for such in the New Zealand context.

Dayana Jalaludin (2011) has carried out her research focusing on Understanding environmental management accounting (EMA) adoption: a new institutional sociology perspective. The findings of this study highlight some interesting insights concerning EMA adoption among manufacturing companies in Malaysia. Although the questionnaire survey found no significant

relation between coercive isomorphism and EMA adoption, the post-survey interviews revealed the opposite. Consistent with the findings of prior management accounting studies the accountants interviewed agreed that they were pressured by their customers, shareholders, head office and the government in terms of environmental performance. This pressure will then influence company policy and, subsequently, affect their management accounting practices, including EMA adoption. He argued that future research on the link between EMA adoption and institutional pressure may also consider the involvement of other parties in the organization.

Vida Lucia Botes and Umesh Sharma (2017) focused his study about The biographical data show that a slight majority of management accountants in SA work in the manufacturing industry. An analysis of the descriptive statistics revealed that two major drivers of change in the business environment, information technology and communication skills, have not been effectively incorporated into MAE. The study also indicated that practitioners held the opinion that they should make greater financial contributions to universities if they wanted more relevant qualifications. It was established from the inferential statistics that practitioners questioned MAE's performance in terms of the BSC in the customer perspective. The findings support the view that more work is needed in the area of the customer perspective to bridge the gap between perceptions of management accounting academics and practitioners. The study contributes to the literature on BSC in MAE (Lawrence and Sharma, 2002; Chang and Chow, 1999). The study opens up areas for policymakers, indicating that more attention is needed in the customer perspective of BSC, and some identified areas in other perspectives to address the gap between academia and practice. A wider repertoire of skills and an intensive insight into the fundamentals of the discipline are required. The study is limited to SA only. Future research could be undertaken internationally to examine whether the findings of this research are supported or refuted elsewhere. The BSC provided a useful framework to analyse MAE and thus has potential to be used in more research studies of higher education.

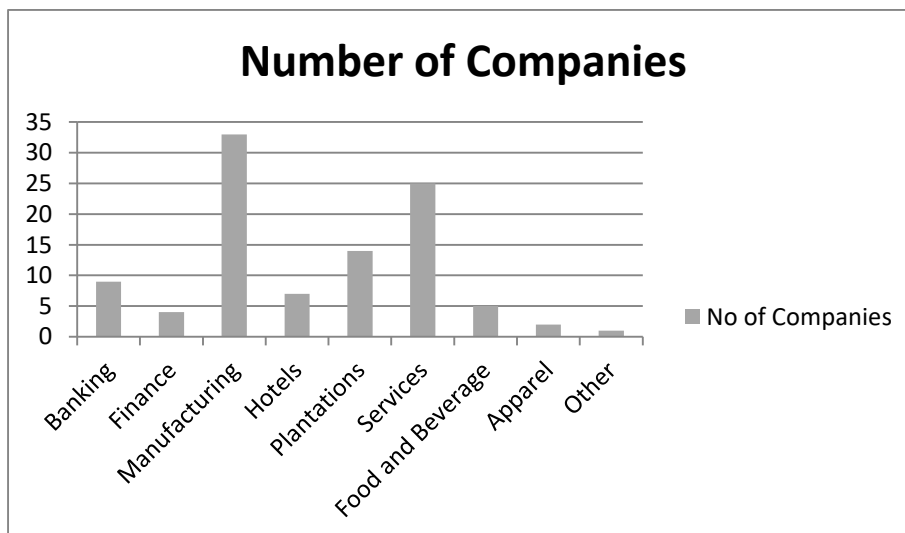
### **3. Research Methodology**

#### **Population and Sample**

Both Quantitative and qualitative data was used in this research by using 100 public listed companies in Sri Lanka. The main aim of this study was to review to what extent the practices of Environment Management Accounting in Sri Lankan Companies are adapted. We categorised the companies based on their sectors.

Table 1: Sample of the research

Sector	Number of Companies	As a % of Total
Banking	9	9%
Finance	4	4%
Manufacturing	33	33%
Hotels	7	7%
Plantations	14	14%
Services	25	25%
Food and Beverage	5	5%
Apparel	2	2%
Other	1	1%



## Data collection

This study employs a mailing structured questionnaire to collect data. 100 questionnaires have been sent to selected managers of Public Listed Companies. Based on the analysis only 51 (51%) were responded and found to be usable. Apart from the interviews, secondary sources were also used to analyse, such as, newspaper articles, annual reports, environmental reports, sustainability reports etc.

The main purpose of this study was to provide basic knowledge of the awareness about Environmental Management Accounting practices in Sri Lankan context. This research basically conducted to identify what are the existing Environmental Management Accounting practices in Sri Lankan public listed companies. When considering EMA practices in companies both financial and non- financial data was linked with this analysis. Therefore, from this study, not



only financial data but also non- financial data were collected. Descriptive analysis and regression analysis were used to analyse the data through SPSS software. Evidence which collected from several sources were used to identify whether EMA implementation enhances performance.

#### **4. Data Presenting and Analyzing**

##### **Respondent's profile**

100 Public Listed Companies were based on this research and out of them, 51 companies have been responded. The finding shows that the majority of the respondents were from service industry. It represented 37.3% out of responded listed companies. Then more responses have been received from manufacturing companies also (25.5%). Food & beverage and other category represent the lowest responses percentage out of the total results.

*Table 2: Respondents' Frequency*

<b>Sector</b>	<b>Frequency</b>	<b>Percent</b>
Services	19	37.3
Manufacturing	13	25.5
Hotel	6	11.8
Banking	4	7.8
Finance	3	5.9
Apparel	2	3.9
Plantation	2	3.9
Food and Beverage	1	2
Other	1	2
Total	51	100

## 1. The EM areas that consider more with daily operations

Table 3: EMA Areas

EMA Areas	Frequency	Percentage (%)
Energy	12	23.5
Materials consumption	9	17.6
Water pollution	6	11.8
Savings from paper recycling	6	11.8
Solid Waste	5	9.8
Carbon foot print	5	9.8
Hazardous Waste	3	5.9
Air emissions	2	3.9
Other	2	3.9
landfill	1	2
Total	51	100

In general, almost all the Sri Lankan enterprises, irrespective of their size, were considered about energy management and its associated accounting practices (Gunarathne et al.2015.). Similar to what Wilmshurst and Frost (2001) identified in Australia, a significant number of practices has been developed in relation to efficient energy usage. Hence accounting for energy is major EMA tool used by Sri Lankan enterprises. Installation of energy efficient lighting and air conditioning systems and solar power systems can be considered as common practices which have been undertaken by Sri Lankan organizations. Based on the above findings, majority of people more considered about the energy consumption than other areas (23.5%). The main reason is, most of the service organizations mainly considered about energy and service organizations reflected more responses among the other industries.

In addition to that material consumption is also considered by several organizations (17.6%). As Bennett and James (1997), they suggested that the collection of data on material flows is vital for environmental related management accounting. It is the first step in successful waste minimization programmes. When considering land fill less number of companies have identified that issue. So it reflects organizations use proper waste management and waste disposal mechanism.

## 2. Use of EMA Practices

Table 4: EMA Practices

EMA Practices	Test Value = 3			t	Sig.	Mean Difference
	Mean	Std. Deviation	Std. Error Mean			
Cost Accounting	2.35	1.585	.222	-2.915	.005*	-.647
Energy flow assessment	2.67	1.608	.225	-1.480	.145	-.333
Capital expenditure and revenue	2.69	1.667	.233	-1.344	.185	-.314
Relevant Environmental Costing	3.00	1.510	.211	0.000	1.000	0.000
Material flow assessment	3.14	1.637	.229	.599	.552	.137
Target Costing	3.37	1.673	.234	1.590	.118	.373
Life cycle Costing	3.39	1.498	.210	1.870	.067	.392
Environmental capital impact assessment	3.45	1.579	.221	2.040	.047	.451
Monetary environmental capital budgeting	3.49	1.405	.197	2.491	.016	.490
Physical environmental investment appraisal	3.55	1.604	.225	2.445	.018	.549
Post Assessment of environmental costing decision	3.57	1.418	.199	2.864	.006	.569
Post assessment of short term environmental impact	3.59	1.472	.206	2.854	.006	.588
Long-term physical environmental planning	3.61	1.601	.224	2.711	.009	.608
Monetary environmental project investment appraisal	3.63	1.496	.210	2.995	.004	.627
life-cycle analysis	3.65	1.547	.217	2.987	.004	.647
Post investment of physical environmental investment appraisal	3.65	1.467	.205	3.149	.003	.647
Monetary environmental operational budgeting	3.67	1.395	.195	3.412	.001**	.667
Environmental long term financial planning	3.73	1.471	.206	3.523	.001**	.725
Physical environmental budgeting	3.75	1.560	.218	3.411	.001**	.745
Life cycle Target Pricing	3.76	1.320	.185	4.136	.000**	.765
Post investment of individual environmental projects	3.82	1.396	.195	4.214	.000**	.824
Life cycle Budgeting	3.94	1.318	.185	5.101	.000**	.941
Life-cycle inventories	4.06	1.448	.203	5.222	.000**	1.059

According to Burrit et.al. (2002), EMA practices involve the tracking, tracing and treatment of costs, earnings and savings incurred in relation to the companies' environmental related activities. *Table 4* shows the practices of EMA and indicates the uses of those practices.

Above table shows the ways of using EMA practices in business organizations. . Since we have assigned the score 1 for highly agree and 5 for highly disagree, lowest mean represents large use of EMA practices. Based on this descriptive analysis, Cost Accounting (2.35), Energy flow assessment (2.67) and Capital expenditure and revenue (2.69) are more used in business organizations.

Life cycle Target Pricing (3.76), Post investment of individual environmental projects (3.82), Life cycle Budgeting (3.92), Life-cycle inventories (4.06) have not used in business organizations. Cost accounting practices represent the highest usage because of the most respondents are commonly using cost accounting practices.

In the *Table 4* mean difference shows how mean values of each practices deviate from the Neutral value. (i.e. Test Value = 3). Negative large mean differences reflect that the practice is more towards score 1 (Highly agree) which says the practice is highly used by the company. So according to *table 4* Cost accounting (-.647), Energy flow assessment (-.333) and Capital expenditure and revenue (-.314) are considered as the EMA practices which were highly used in Sri Lankan context proved through the results of means in the *table 4*.

### **3. Factors influencing EMA practices**

Institutional pressure is the pressure faced by organizations to improve environmental performance from the government, profession and society. (DiMaggio and Powell, 1983; Nakamura et al.,2001). Generally, this pressure can be classified into three types of mechanisms, namely; coercive isomorphism, normative pressure and mimetic processes (DiMaggio and Powell, 1983).The process of deriving the items to measure institutional pressure includes an extensive literature review. Earlier studies have identified various sources of institutional pressure including government regulation, fines, members in accounting body, customers, local communities, leaders in the industry, multinationals and competitors etc.

Table 5: Factors influencing EMA practices

Factors influencing EMA practices	Mean (Test value =3)	Std. Deviation	Sig. (2- tailed)	Mean Difference
<b><u>Coercive</u></b>				
Environmental laws	1.73	0.802	0**	-1.275
Government regulations	1.86	0.917	0**	-1.137
Government pollutions standard	1.96	0.958	0**	-1.039
pollution incidents law	2.08	0.913	0**	-0.922
Company's head office	2.12	0.816	0**	-0.882
Local communities	2.24	0.79	0**	-0.765
Environmental groups	2.25	0.717	0**	-0.745
Company's shareholders	2.27	0.723	0**	-0.725
Company's customers	2.57	0.64	0**	-0.431
Financial institutions	2.96	0.871	0.749	-0.039
Company's labour union	3.02	0.905	0.878	0.02
<b><u>Normative</u></b>				
Motivation from staff training	2.71	1.026	0.046*	-0.294
<b><u>Mimetic</u></b>				
Competitors	2.37	1.019	0.00**	-0.627
Other industrial organizations	2.55	0.966	0.002**	-0.451
Other leaders in the industry	2.61	1.002	0.007**	-0.392
Multinational organizations	3.1	1.005	0.489	0.098

Since we have assigned the score 1 for highly agree and 5 for highly disagree, lowest mean represents the most influential factor for the adoption of EMA in Sri Lanka. According to our results, Environmental laws, Government regulations and Government pollution standards which related to coercive factors are considered as more influential. Motivation from staff training can be considered as a normative factor Competitors, Other institutional organizations which related to mimetic factors are also considered as more influential. Motivations from multinational organizations are less influential for the adoption of EMA since they get higher means.

In the Table 5 mean difference shows how mean values of each factor deviate from the Neutral value i.e. Test Value = 3. Negative large mean differences reflect that the factor is more towards score 1 (Highly agree) which says highly influential. So according to table 5 Environmental laws (-1.275), Government regulations (-1.137) and Government pollution standards (-1.039) are considered to be more influential which were proved through the results of means in the table 5.

And also it can be evidenced through the significant value in the table 5. If sig. < 0.05, the factor is highly impacting the adoption of EMA and if sig. >0.05, the degree of influence is lesser. Therefore financial institutions, company's labour union and multinational organizations are less influential since they possess higher significant values which are above the 0.05.

Those factors can be summarized as an overall result of descriptive analysis as shown in table 5.1.

*Table 5.1: Basic Factors*

<b>Institutional Factors Influencing EMA</b>	<b>Mean</b>
Coercive factors	2.28
Mimetic Factors	2.66
Normative factors	2.71

#### **4. Importance of environmental management accounting practices**

Due to the expansion of green concept business organizations have encouraged to consider environmental effects of their activities and emphasize the environmental matters when decision making. According to the empirical studies were done by the previous scholars there were more benefits derived from the EMA namely cost reduction, cleaner production, and better product pricing and increased shareholder value. Also with the impact of this benefits leads to enhance the corporate reputation since launching green products to the market and performing corporate activities with less harmful effects on surrounded environment.

Some of the countries use EMA as to eco efficiency in their production in order to minimize the cost of wastage. By utilizing the cost flow analysis, identify the cost of waste processing and losses from processes on large raw material. In addition, cost analysis leads to upgrade the environment information in terms of both monetary and physical and improve the firm's environmental management. Also implementing eco efficiency measures in product development stage, supports to efficient utilization of resources and energy in the process of production.

EMA practices lead to innovation towards lean and green supply chain among the partners in order to acquire the significant cost saving from environmental consideration. For Instance, GM was able to reduce their cost of disposal by \$12 million since innovative material handling with their suppliers throughout the period from 1987 to 1992. Relevant to the Andersen Corporation there are 50% gain from investing in the wood waste in their production process innovatively. Commonwealth Edison, electric utility company had gained \$2 million annually for reducing its landfill disposal volume. Kodak recycled 77 to 86 percent of camera materials from return products and saved significant costs. This evidence proves that how EMA practices support for the firms to improve their performance. With the support of the EMA firms are able to minimize their operating cost, better pricing their products and protect the natural resources. Also it helps

to identify the environmental which commonly are hidden in overhead costs and neglected by managers. Finally it leads to increase the shareholder wealth and reputation of the firm.

EMA result for gain competitive advantage in the dynamic environment. For example, suppose if an organization will reduce the demand for energy by 10% and need more resources and material by 20% due to recycling, and they have been able to offer a "greener" product, and provide tangible information on that product. Organization will be able to either sell a greener and more environmentally sound product for the same price as their competitor's average product, or they will be able to outbid competitors because they can offer the same product with a slight discount due to their cost savings.

The result of the environmental accounting system helps the management to develop its environment strategy for moving toward a greener corporate culture. Also proper environmental accounting system facilitates proper reporting of the results of environment practices followed by the company. It facilitates communicating environmental performance towards stakeholder which goes a long way in enhancing the corporate image of the organization. EMA leads substance to verify compliance to local, national, international standards or best available techniques as well as company's own standard as stand in company environmental policy.

EMA provides a database to take corrective actions and decide future plans. It identifies the area where the steps have to be taken to reduce the wastage, raw material and energy consumption. Also it resulted in management in develop its environment strategy for moving towards a greener corporate culture. It helps to measure the environmental problem impact of each and every process and operation on the air, water, soil workers health and safety and society at large. This system helps to detect any leakages spills or any such problems with the operation and process at an early stage, thus reducing the risk of future problem.

## **5. Benefits of EMA practices**

Use of EMA gives several benefits. It includes mitigating the environmental impact, attracting quality human resources, improving reputation of the company, improving corporate image, better relationship with stakeholders, increasing customer relationship, reducing the impact from outsiders, increasing demand for green product and reducing legal cost etc. The study also notes that the use of EMA typically beneficial to the organizations by providing them different information for decision making (Adams & Zutshi, 2004). Such information help for better waste management process, reduced energy & material consumption or material recycling. Further this information help for development of efficient process & leads to innovation. Recent period companies suffered lot of problem because of damaging environment through operation. Most of the organizations have identified that they will get lot of advantages using EMA Practices. Company needs social license to operate in the society. Therefore, it is needed to do operation of the company in environmentally friendly manner.

Table 6: Benefits of EMA Practices

Benefits of EMA Practices	Mean (Test Value = 3)	Std. Deviation	Sig. (2-tailed)	Mean Difference
Improve corporate image	1.59	0.606	0.00**	-1.412
Mitigate the environmental impact	1.75	0.523	0.00**	-1.255
Environmental improvement	1.82	0.59	0.00**	-1.176
Reputation improvements	1.82	0.817	0.00**	-1.176
Better relationship with stakeholders	1.86	0.693	0.00**	-1.137
Increase customer relationship	2.06	0.676	0.00**	-0.941
Attraction of human resources	2.12	0.765	0.00**	-0.882
Reduce the legal cost	2.14	0.96	0.00**	-0.863
Increased demand in green products	2.18	0.74	0.00**	-0.824
Providing information for decision making	2.2	0.633	0.00**	-0.804
Reducing impact from outsiders	2.22	0.673	0.00**	-0.784
Material Recycling	2.27	0.896	0.00**	-0.725
Minimize the total cost	2.41	0.92	0.00**	-0.588

Table 6 reflects the descriptive statistics for the benefits of EMA practices. Since we have assigned the score 1 for highly agree and 5 for highly disagree, lowest mean represents benefits they get most. As an overall of the findings, all benefits have been considered and expected by using EMA practices. According to our results, companies have a perception that use of EMA practices leads improving corporate image (1.59), mitigating the environmental impact (1.75), Reputation improvements & Environmental improvement (1.82) and Better relationship with stakeholders (1.86).

In the Table 6, mean difference shows how mean values of each factor deviate from the Neutral value i.e. Test Value = 3. Negative large mean differences reflect that the factor is more towards score 1 (Highly agree) which says highly influential. In our study, improved corporate image (-1.412), Mitigate the environmental impact (-1.255), Environmental improvement (-1.176), Reputation improvements (-1.176) Better relationship with stakeholders (1.137) & Increase customer relationship (-0.941) are recorded higher negative mean difference. It revealed companies are highly agreed with these benefits.

It is also evidenced through the significant value in the table 2. If some benefit record sig. value which is less than 0.05, it revealed that it creates significant benefit to the company. If sig. is higher than 0.05, degree of influence is lesser. In our study, all benefits have negative mean difference. It means companies have highly agree & agree with all benefits. So, companies have realized that use of EMA practices lead to higher benefits to their business.



## 6. Barriers to Implement EMA Practice

Adapting from Che Zuriana Muhammad Jamil, Rapih Mohamed, Faizulaini Muammad, Amin Ali (2015) respondents were asked to measure on a scale of 1 (Highly agree) to 5 (Highly disagree) on factors hindering EMA practices. The result shows that Resource constraints (2.02) is one of the most important factor that prevent the organization from practicing EMA. It is the major barrier to EMA adoption, especially when the other projects appear to enhance short term profitability. In addition to the Physical environmental uncertainty (2.16), Financial Barriers (2.2) Difficulties in collecting or allocating environmental costs (2.27) are the main barriers to the implementation of EMA practices in Public Listed Company in Sri Lanka. This result supports the position of the study by Jamil et al., (2015) that finds financial barriers as a challenge to EMA practices by Malaysian manufacturing SMEs. With regards to Efficiency of financial considerations (2.35), study shows that also lead to the decision not to implement EMA practices. These findings are consistent with Johnson (1993) that indicates the lack of guidance on EMA. Further this study is emphasized that information barriers (2.43) are the main aspect to prevent implementation of EMA. As an example, due to difficulties in collecting, identifying and evaluating environment related data effectively leads to provides little or no incentives for management to manage environmental costs.

Physical environmental uncertainty can also be in form of low priority of accounting for environmental costs (2.47) and reluctance to change while financial barriers come in form of considerations for the cost implications of EMA, efficiency or financial consideration as to whether cost of implementation outweighs the benefits and vice versa, resources constraints, and magnitude of environmental costs. The least barriers are lack of integrating the environment in to strategic planning and resistance to change with equal mean (2.69) each. In addition, lack of environmental responsibility and accountability (2.90) cannot be identified as a main barrier to implement Environmental Management Accounting in Public Listed Company in Sri Lanka. Therefore, it takes the low mean value. Finally, according to this analysis environmental costs are not considered significant (2.96)

The result of the study indicates that the major limitation to EMA practices in public listed company in Sri Lanka is resource constraints. This barrier exists because of weakness of institutional forces such as government, shareholders and all other stakeholders in promoting environmental conscious society. The other major limitation is to implementation of EMA practices in public limited company is financial barrier. The high point and foundation of this barrier is on whether the cost of implementing EMA outweighs its benefit. This is because since EMA represents increased costs and investments, with negative effect on the firms' bottom-line, studies and practical cases of its implementations have shown that it does not lead to increase financial performance. However, since dirty production, waste and pollution are signs of low efficiency, then clean production (CP) is a sign of more efficient production, which enhances performance different from financial performance such as strategically positioning of environmental friendly firms as superior than others that are not and in principle this is economically superior with profitability in the long run.

Table 7: Barriers to EMA Practices

Barriers to implement EMA Practices	Mean Test Value = 3	Std. Deviation	Std. Error Mean	Sig. (2-tailed)	Mean Difference
Resource constraints	2.02	.707	.099	.000	-.980
Physical environmental uncertainty	2.16	.731	.102	.000	-.843
Financial Barriers	2.20	.749	.105	.000	-.804
Difficulties in collecting or allocating environmental costs	2.27	.896	.125	.000	-.725
Efficiency of financial considerations	2.35	.658	.092	.000	-.647
Information Barriers	2.43	.900	.126	.000	-.569
Few incentives provided to manage environmental costs	2.45	.856	.120	.000	-.549
Low priority of accounting for environmental costs	2.47	1.007	.141	.000	-.529
Resistance to change	2.69	.927	.130	.019	-.314
Lack of integrating the environment in to strategic planning	2.69	1.010	.141	.031	-.314
Lack of environmental responsibility and accountability	2.90	1.005	.141	.489	-.098
Environmental costs are not considered significant	2.96	1.166	.163	.811	-.039

## 7. Future areas for study

According to the research findings, Public listed companies in Sri Lanka reflect weak awareness about Environmental Management Accounting practices. There are many barriers that related to the diffusion of EMA practices. So there should be future study for investigates factors and barriers which influence the practices of EMA.

The authors are currently studies about EMA Practices, Factors, Barriers and Benefits cumulatively. Though the authors did not analyse those arears deeply, future researchers influence to further studies with addressing above arears separately.

Moreover, while dealing with Sri Lankan organizations, the authors captured that these organizations are at different levels of adoption of environmental strategies and hence EMA.

Understanding how the level of development of EMA together with environmental management also offers potential for future research. Hence, the areas for study are widely open and largely unexplored, and the authors consider this as an area with great potential for researchers. Future

researchers be able to expand their view by adding further areas to studies also adding further questions in questioner.

Researchers have an opportunity to study latest highlights in EMA in Sri Lanka and the world and assemble them in to their studies such as green university concept, Green Banking. Further it will be adding value that studies conducted on practical environment scenarios.

There have various factors that affected on implementing EMA Practices, however these factors are not only limited for the PLCs. The factors have an impact on Private Limited companies, small and medium size companies also and they have to follow these EMA Practices to these necessary degrees. This factor also can be taken as a widely open and largely unexplored area for future study about EMA practices in Private limited, small and medium organizations in Sri Lanka.

## **5. Discussion and Conclusion**

According to our Discussion we hoped to achieve four objectives namely whether EMA practices are exercised by Public Listed Companies or not, identifying the factors which are affecting to exercise EMA Practices, identifying barriers for not using or less using EMA practices by Public listed companies & identifying benefits of using EMA Practices.

For that purpose, we selected 100 Public Listed companies covering Banking, Finance, Manufacturing, Hotels, Plantations, Services, Food & Beverage, Apparel industries out of 295 companies. Throughout those companies we were privileged to receive 51% response rate. Therefore our overall analysis was based on those 51 companies until windup the research.

When we analyzing our sample we found that the areas which companies highly use EMA Practices as Life cycle inventories (Mean 4.06) Life cycle budgeting (Mean 3.94) and Post investment of individual environmental projects (Mean 3.82).

The reasons for usage of EMA practices are significance of EMA practices to the organization & benefits received to the organization through EMA Practices .According to the analysis which was carried out by us these benefits include cost reduction, cleaner production, and better product pricing and increased shareholder value, efficient utilization of resources and energy , cost saving from environmental consideration , minimizing operating cost, better pricing their products and protect the natural resources , mitigating the environmental impact, attracting higher human resources, improving reputation of the company, improving corporate image, better relationship with stakeholders, increasing customer relationship, reducing the impact from outsiders, increasing demand for green product and reducing legal cost etc.

While some PLC companies moderately use EMA practices most of the organizations less use these practices or they hesitate to use these practices due to the barriers for exercising EMA practices. Due to our findings Lack of environmental responsibility and accountability,

environmental cost are considered as not significant, Lack of integrating the environment in to strategic planning , resistance to change , Resource constraints, Physical environmental uncertainty , financial barriers , lack of Knowledge EMA practices do not play a major role in today's business context.

Environmental Management Accounting is an emerging concept in present business context. The relevant Authorities & each organization should take some actions to spread & establish this concept in depth. Increasing allocation of funds for EMA Practices, improving knowledge on EMA Practices, increasing environmental responsibility & accountability through imposing rules, Motivating business organizations to exercise EMA practices through awarding certificates etc.

Public Listed Companies are the giants in the business world in Sri Lanka. But they are also using EMA practices Moderately, if it is so there is no use of analyzing EMA practices used by small and medium size entities. But EMA should be a well emerged practice in the business world irrespective of the size, type & nature of the organization. It is not responsibility of one party or one organization; It becomes a collective responsibility of the business, government & society.

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## Appendix 1: Questionnaire sent to the business organizations

### Questionnaire on Environmental Management Accounting Practices in Sri Lankan Public Listed Companies.

Department of Accounting,  
Faculty of Management Studies and Commerce,  
University of Sri Jayewardenepura,  
Gangodawila,  
Nugegoda.

Dear Sir/Madam,

This questionnaire will be a supporting to the group research done by the final year students of Department of Accounting. The aim of this questionnaire is to obtain an understanding about the Environmental Management Accounting practices in your organization.

This questionnaire consists of 5 questions and it just take only few minutes to complete. Please be assured that your responses will be kept strictly confidential and only be used for academic purpose. Individual participants will not be identified in the analysis as only aggregate results will be analysed and presented.(Organization and the position can be mentioned as your wish and It will be beneficial us to fill the company name at least)

\*Required

1. Name of the organization

\_\_\_\_\_

2. Position

\_\_\_\_\_

3. Company Type \*

Mark only one oval.

- Manufacturing
- Food and Beverage
- Banking
- Hotel
- Services
- Apparel
- Other: \_\_\_\_\_

## 4.1. What are the EM areas that you consider more with your daily operations? \*

Mark only one oval.

- Air emissions  
 Water pollution  
 Solid Waste  
 Hazardous Waste  
 Noise  
 Energy  
 Materials consumption  
 Carbon foot print  
 Savings from paper recycling  
 landfill  
 Other: \_\_\_\_\_

## 5.2. What are the factors which have been highly affected to your organization when applying Environmental Management Accounting (EMA) Practices? \*

Mark only one oval per row.

	Highly Agree	Agree	Neutral	Disagree	Highly Disagree
Pollution incidents law	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government pollutions standard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company's shareholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental laws	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local communities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company's customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company's head office	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial institutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company's labor union	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motivation from staff training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other industrial organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other leaders in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multinational organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**6.3. What are the EMA Practices which have been highly concerned in your organization? \***

Mark only one oval per row.

	Highly Applicable	Moderately Applicable	Lightly Applicable	Never Applicable	Not relevant
Material flow assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy flow assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life-cycle inventories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life-cycle analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical environmental investment appraisal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical environmental budgeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Long-term physical environmental planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental capital impact assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post assessment of short term environmental impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post investment of physical environmental investment appraisal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Accounting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life cycle Costing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Target Costing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevant Environmental Costing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life cycle Budgeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life cycle Target Pricing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monetary environmental operational budgeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Capital expenditure and revenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monetary environmental project investment appraisal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post Assessment of environmental costing decision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monetary environmental capital budgeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post investment of individual environmental projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental long term financial planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**7.4. What are the barriers that you have to face when applying EMA Practices? \***

Mark only one oval per row.

	Highly Agree	Agree	Neutral	Disagree	Highly Disagree
Low priority of accounting for environmental costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resistance to change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial Barriers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resource constraints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficiency of financial considerations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental costs are not considered significant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information Barriers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in collecting or allocating environmental costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical environmental uncertainty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Few incentives provided to manage environmental costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of environmental responsibility and accountability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of integrating the environment in to strategic planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**8.5. What are the benefits that you suppose to gain from EMA Application? \***

Mark only one oval per row.

	Highly Agree	Agree	Neutral	Disagree	Highly Disagree
Minimize the total cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mitigate the environmental impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental improvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attraction of human resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reputation improvements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing information for decision making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Material Recycling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve corporate image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Better relationship with stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase customer relationship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased demand in green products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing impact from outsiders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduce the legal cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Thank You For Your Cooperation !!!!!**









Difficulties in collecting or allocating environmental costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
Low physical environmental uncertainty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1

<b><u>Institutional Barriers</u></b>																													
Lack of institutional pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
Stakeholder power	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5
Shareholder power	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1
	<input type="checkbox"/>																												
<b><u>Management Barriers</u></b>																													
Few incentives provided to manage environmental costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
Lack of environmental responsibility and accountability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
Lack of integrating the environment in to strategic planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3
Lack of advocacy from the university leadership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1
			<input type="checkbox"/>		<input type="checkbox"/>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
<b><u>Areas covered</u></b>																													
water pollution	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4



