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Cases in Sustainability Management Accounting -Sri Lanka

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Cases in Sustainability Management Accounting

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Edited by
A D Nuwan Gunarathne
Lecturer, Department of Accounting, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

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Sepali Bamunusinghe, Lecturer, English Unit, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

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Department of Accounting

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Prosper lives through learning

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To be the premier centre of excellence in accounting education, research and industry engagement in South Asia

Our values

Wisdom
Intellectual rigour
Professionalism
Truthfulness & Ethical conduct
Equality
Helpfulness and Compassion

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Preface

Business entities, a part of a much larger social and environmental system, constantly interact with and depend on its surroundings in carrying out their activities. Inevitably, certain actions of these entities may adversely affect the environment within which they operate. These undesirable effects triggered much discussion among various parties ranging from social services organizations to national governments and international bodies over the past few decades, and as a result, the need for development with minimal negative implications to the social system arose. This need gave birth to the reasonably novel concept of *sustainable development.* As per a report titled *Our Common Future* of the United Nations World Commission on Environment and Development in 1987, sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". As such, a futuristic perspective was introduced to current development initiatives and the impact of businesses activities on the society came to the forefront of many vital decision making situations. A publication titled *Sustainability: the role of accountants* by the Institute of Chartered Accountants in England and Wales (2004) emphasizes on the importance of sustainability regardless of whether organizations subscribe to the concept of sustainable development or not, since sustainability concerns of individuals, societies and governments help shape the world in which organizations operate.

Any professional's role should reflect the prevailing needs of the society, and the accountant is no exception to this fact. Thus, with the emerging interest on sustainable development, a new transdisciplinary branch in accounting labeled as Sustainability Management Accounting (SMA) has evolved in the recent past. *Sustainability and the role of the management accountant,* a report published by the Chartered Institute of Management Accountants – UK (CIMA) in 2011, revealed that since collection and analysis of good, issue-specific data is crucial to sustainability decisions, accountants are required to monitor and manage non-traditional data to guide such strategic decisions, further confirming the importance of SMA.

However, the CIMA report highlights that although potential exists for management accountants to be collaborators in the achievement of sustainability goals, the potential is yet to be fully grasped. A publication titled *Emerging pathways for the next generation accountants* (2012) of the Institute of Chartered Accountants in Australia (ICAA) discusses this failure in accountants to engage with sustainability oriented accounting, and proposes the lack of knowledge and skills required as a possible explanation to the situation. In this context, the importance of accounting education in harnessing such knowledge and skills is

highlighted. The report, based on a research conducted in South Australia, discovered that, presently universities provide little or no knowledge on SMA to graduates, but majority of business managers would prefer to recruit graduates with SMA education in future. This finding emphasizes the importance of SMA knowledge for an accounting graduate's career in time to come.

Identifying this contemporary need, the Department of Accounting of the Faculty of Management Studies and Commerce of University of Sri Jayewardenepura has included SMA as part of the degree curriculum for its undergraduates and has provided students the opportunity to not only learn SMA in a class-room environment, but also to witness SMA initiatives in practice in Sri Lanka. The first issue of the *Journal of Accounting Panorama* of the Department of Accounting is dedicated to the outcomes of its SMA education, where the students have carried out researches on varying aspects of SMA practiced in a range of industries in Sri Lanka. The publication of the outcomes of these researches will contribute to disseminate much needed new knowledge on SMA to the accounting profession.

In this new age of development for Sri Lanka, keeping in par with the global initiatives towards sustainability is vital and the study of an accountant's role in meeting this end is both timely and imperative.

Professor D S N P Senaratne
Head, Department of Accounting
Faculty of Management Studies and Commerce
University of Sri Jayewardenepura, Nugegoda
Sri Lanka.
27th Match, 2014

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Personal reflections on Introducing a Sustainability Management Accounting Course Unit to an Undergraduate Accounting Degree Program

Gunarathne A D N*
Department of Accounting, University of Sri Jayewardenepura, Sri Lanka

It all began in a small scale...

One day, when I was reading the new edition of Drury's (2007) Management and Cost Accounting book, I happened to come across a section on environmental cost accounting. It was an ignition to resume my love with the environment after a long period of detachment caused by my higher education. After seeing the light of the world on the World Environmental Day and being the President of the Environmental Society of the school, higher education detached me from my love for the environment for a considerable period. The chapter of Drury was indeed a pleasant eye-opener that there's a place for the environment in my field of management accounting.

The journey began...

Then I found myself busy reading materials on environmental management accounting (EMA). For an area initially thought to be new and untrespassed, I came across an unexpected sea of resources on EMA. The introductory documents of Environmental Protection Agency (EPA) (1995) and International Federation of Accountants (IFAC) (2005) on EMA gave me a better initial understanding on this field. It was during this time, one my colleagues invited me to few topics on "contemporary issues in management accounting". I introduced a topic called "harmonizing with environment- EMA" to these sessions, boldly, even without having a standard text book which can be used for teaching. Primary purpose was for me to learn EMA before I taught the students. Luckily, I came across the book "issues in management accounting" and a chapter on EMA (Soonawala, 2006). It was the base chapter for my first session on EMA.

Then came my MBA thesis at a time I was in love with EMA deeply. I soon grabbed the opportunity by opting for a topic in EMA. The thesis then allowed me to study the subject thoroughly and seriously. At this point, I started writing on EMA. Also, I

* Email: adnuwan@gmail.com

was invited to make a presentation on EMA at the CMA conference in 2012. It was during this time I became aware of the Environmental Management Accounting Network (EMAN)* and I registered myself for its news letter, keeping myself updated on its developments. Soon I saw myself attending two conferences of EMAN in Helsinki and Gold Coast. By that time I had realized the importance and the practical value of EMA. In 2011, when the Department of Accounting initiated a syllabus revision, a new subject on this field was introduced to the curriculum of the B.Sc. Accounting (Special) Degree Program.

Recognizing the importance of environmental and sustainability education for accountants, as highlighted by Tingey-Holyoak and Burritt (2012), Institute of Chartered Accountants in England & Wales (ICAEW) (2004) and Medley (1997), the Department of Accounting, University of Sri Jayewardenepura, the pioneer in academic accounting education in Sri Lanka, introduced this subject "Sustainability Management Accounting (SMA)" for the first time in an undergraduate degree program in Sri Lanka. This first volume of the Journal of Accounting Panorama is the result of the work done by the students in that course unit. The Journal of Accounting Panorama is the first publication on SMA in Sri Lanka.

Before I present details on the course unit of SMA, an overview of this emerging discipline is presented here.

Environmental/Sustainability Management Accounting

EMA lacks a definite boundary or definition. Yet, it has emerged as an interface between management accounting and environmental management (Bennett *et al.*, 2002). The definitions of United Nations Division for Sustainable Development (UNDSD) (2001), Burritt *et al.* (2002 a, b) highlight that EMA is the identification, collection, analysis and use of physical information, on the use, flows and destinies of energy, water and materials (including wastes) and monetary information on environment-related costs, earnings and savings for internal decision making. Accordingly, there can be two types of EMA systems, i.e., physical EMA and monetary EMA. Physical EMA focuses on a company's impact on the natural environment expressed in terms of physical units while monetary EMA reflects the impact of corporate activities on economic systems and is expressed in monetary units.

EMA information provided by these systems may encompass three dimensions: the time frame, which is the period being addressed by different tools (past, current or

*EMAN, founded in 1997, is the global network of academics and professional experts in the area of environmental and sustainability management accounting. Please visit www.eman-eu.net for more details.

future); the length of time frame, which is the duration of the period being addressed by the tool (tools addressing the short term vs. Long term; and the routineness of information, which is the ad hoc vs. routine gathering of information. Based on the dimensions of EMA information, Burritt *et al.* (2002 a, b) have suggested a comprehensive framework for EMA (refer Figure 01). EMA is not merely an environmental management tool among others, but it is a broad set of principles and approaches that provide information for the successful implementation of environmental strategies. Hence, it includes a wide array of accounting practices such as accounting for energy, material flow cost accounting, environmental capital budgeting, life cycle analysis, etc. Day-by-day, new EMA practices are being introduced or existing practices are being adopted.

Figure 01: Comprehensive EMA Framework

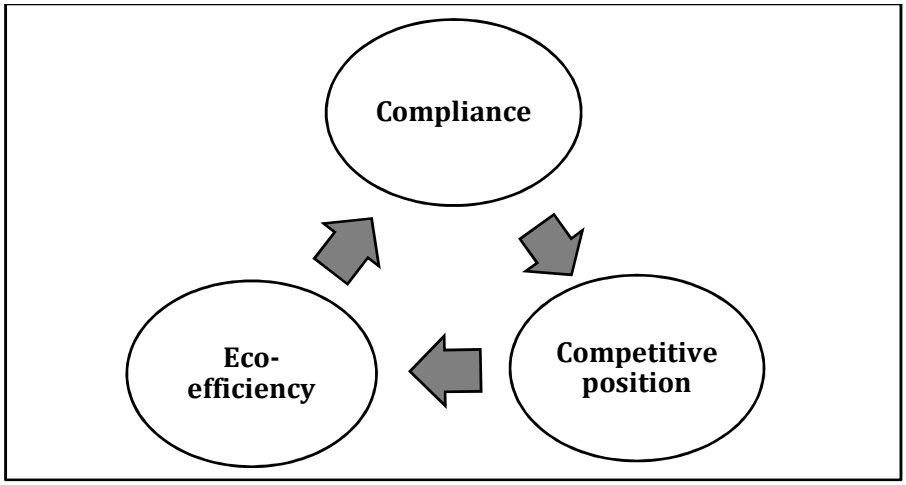
		Environmental management accounting (EMA)			
		Monetary environmental management accounting		Physical environmental management accounting	
		Short term focus	**Long term focus**	**Short term focus**	**Long term focus**
Past oriented	Routinely generated information	Environmental cost accounting	Environmentally induced capital expenditure and revenues	Material and energy flow accounting	Environmental capital impact accounting
	Ad hoc information	Ex post assessment of relevant environmental costing decisions	Environmental life cycle costing Post investment assessment	Ex post assessment of short term environmental impacts	Life cycle inventories Post physical environmental investment appraisal
Future oriented	Routinely generated information	Monetary environmental operational budgeting Monetary environmental capital budgeting	Environmental long term financial planning	Physical environmental budgeting	Long term physical environmental planning
	Ad hoc information	Relevant environmental costing	Monetary environmental investment appraisal Environmental life cycle budgeting	Relevant environmental impacts	Physical environmental investment appraisal Life cycle analysis

Source: Burritt *et al.* (2002)

EMA benefits

The benefits of EMA are many, but can be broadly categorized into three (Doody, 2010; IFAC, 2005). Firstly, EMA ensures compliance with environmental regulations and self-imposed environmental policies. Secondly, EMA supports eco-efficiency by the efficient use of water, material and energy while reducing the environmentally harmful impacts. Thirdly, it enables a firm to gain a competitive position by establishing and strengthening an organization as a green organization. These benefits are not mutually exclusive and there is overlap in many instances. Moreover, these benefits are interlinked as outlined in Figure 02.

Figure 02: EMA benefits

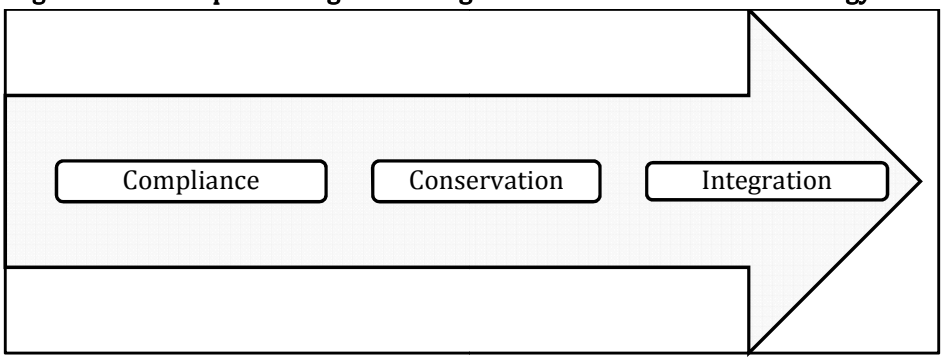


Source: Adopted from Doody (2010) and IFAC (2005)

Development of environmental strategy

As highlighted earlier as well, EMA is a decision support tool that can assist the environmental strategy of an organization. In order to derive the aforementioned benefits EMA has to be applied well in-conjunction with the environmental strategy. Yet, Bartolomeo *et al*. (2000) and Lee (2011) suggest that most of the existing EMA practices have not been systematically and comprehensively implemented internally. Thus, there is potential for the organizations to be adventurous and explorative in their EMA practices. The systematic adoption of EMA can't simply be achieved overtime. Hence, it is necessary to identify the development stages of EMA. The development stages of EMA have been suggested by Sakai (2007) and IMA (1995). Further, Gunarathne and Lee (2014) have empirically demonstrated how a Sri Lankan hotel developed its environmental strategy over time. The development stages of an organization's environmental strategy are given in Figure 03.

Figure 03: Development stages of an organization's environmental strategy



Source: Developed by the author based on Sakai (2007) and IMA (1995)

Organizations in stage 1 will develop environmental management programs (or a strategy) in response to both external pressures and internal awareness (IMA, 1995). As there are many regulations covering the environmental issues, every organization will be in some degree of compliance stage as a response to an external pressure. However, absence of regulations may sometimes call for internal management setting environmental standards. During this stage, an organization should; ensure the top management commitment/support; develop an environmental policy; prepare an action plan to achieve the goals set in the environmental policy and create an environmental management system. Organizations in this stage will;

- Focus mainly on few items in its environmental policy (such as waste, energy, etc.)
- Develop few EMA practices (accounting for waste or energy accounting with the main focus on physical EMA)
- Mainly obtain support of few key stakeholders (such as employees or suppliers) to implement these strategies

Then, the organizations will soon realize the conservation potential of the environmental initiatives being adopted. This is where organizations are propelled to move onto the second stage of development, i.e. conservation stage.

During the conservation stage, organizations realize that the adoption of these practices give them a real cost saving potential. Therefore, organizations will design products or processes taking environmental impacts into account and develop a strategy for external environmental reporting. According to Sakai (2007), during this stage, organizations will take actions with a sense of mission as an earth citizen to reduce environmental impact. Organizations in this stage;

- Gradually expand the focus of its environmental policy to larger range of items

- Develop more EMA practices
- Attempt to obtain the support of other stakeholders

When these attempts are successful organizations will move to the third level of development, i.e. environmental integration stage.

During the environmental integrations stage, organizations fully integrate environmental considerations into its business operations. In other words, environmental considerations are integrated into the long term sustainable strategy of an organization (IMA, 1995). The environmental issues, irrespective of the magnitude, are part of everyone's day-to-day decision-making process. During this stage, organizations will develop environmental impact-integrated performance evaluation system and green products while deriving the full potential/benefit of environmental management strategies. Organizations in this stage will;

- Integrate all the items contained in the environmental policy (comprehensive coverage)
- Have well developed EMA practices
- Obtain the support of all stakeholders

The arrow given in the Figure 03 represents the further potential for EMA development even beyond the integration stage.

EMA to SMA

When social dimensions are integrated into the existing EMA systems, i.e. when environmental and social accounting systems are adopted, there will be SMA. However, as Jasch and Stasiškienė (2005) highlight, for many years sustainability has been seen more in an environmental perspective and the social side of sustainability has developed the least. Moreover, accounting for the social dimension of sustainability proves to be a challenge for corporate practitioners, due to its intangible, qualitative nature and lack of consensus on relevant criteria (Geibler *et al*., 2005). Due to this reason, the course unit introduced has a greater emphasis on environmental dimension of sustainability. The next section will describe the novel, unconventional course unit introduced by the Department of Accounting, with the objective of disseminating the knowledge on SMA.

SMA first course unit – modus operandi

SMA was introduced as an elective course unit and it was an extension to the already existing management accounting cell of the Department of Accounting (refer Table 01).

Table 01: Subjects in the management accounting cell, Department of Accounting

Year	Semester	Subject offered
4th year	2nd semester	Strategic Management Accounting Contemporary Issues in Management Accounting (E)
	1st semester	Sustainable Management Accounting (E)
3rd year	2nd semester	
	1st semester	Advanced Management Accounting
2nd year	2nd semester	Cost and Management Accounting
	1st semester	

(E) Elective course units

Source: Prospectus of University of Sri Jayewardenepura (USJ) - Faculty of Management Studies of Commerce (FMSC), (2012)

The main objective of the course unit was to improve the understanding on this area as it will help students to incorporate environmental and social considerations into business decisions, which will ultimately facilitate in the development of corporate sustainability strategy as emphasized by Das, *et al*. (2008). The course unit was designed to give students a practical orientation. In this regard, the following actions were taken.

- Design of course content based on practice with theoretical underpinnings
- Adoption of action oriented learning
- Giving practical exposure to students through site visits, guest lectures, etc
- Assignment to develop case studies on real-life companies

In designing the course, the learning objectives attempted to achieve were a)to discuss the developments in management accounting to embrace the sustainability movement/revolution, b) to discuss the three pillars of Triple Bottom Line (TBL) discussed in sustainability i.e. economic, social and environmental dimensions, c) to evaluate the possibility of integrating the various facets of sustainability into a coherent business management model and the role of accountant in that context, d)to appraise the various frameworks available for reporting sustainability in an organization and e) to discuss the SMA status quo in Sri Lanka in the global context. Please refer Table 02 for the summarized themes of the course outline.

Table 02: Summarized course outline of SMA course unit

Area	Coverage
New developments in management accounting towards sustainability	Need for sustainability management accounting Corporate sustainability, Sustainable business TBL movement, Sustainability Triangle
Environmental Management Accounting (EMA)	Scope, applications, drivers, benefits techniques and roadblocks Cleaner Production (CP) (Methodology, Support from EMA for CP

Accounting for the social dimension in sustainability	Social Accounting (SA) and Social Management Accounting Social audit, Socially Responsible Investing (SRI) Social Return on Investment (SROI)
Integration of three pillars of sustainability	Sustainability Balanced Scorecard (SBSC) Addressing the economic bottom line The role of an accountant
Frameworks available for reporting sustainability	ISO 14000, 19011, 22000, 26000, 50001 standards Sustainability reporting based on Global Reporting Initiative Guidelines AA1000 stakeholder engagement standard, SA 8000 standard Sustainability Reporting and Integrated Reporting <IR>
SMA Theory	Importance of having theoretical frameworks Institutional theory, Stakeholder theory, Legitimacy theory
SMA: A Sri Lankan perspective in the global setting	The global scene Sri Lankan status

Source: Department leaflets

There were fifty one students who opted for the subject. The reason for this overwhelming response for the subject was its novelty. To confirm this, one student mentioned;

> *"I have learned enough accounting... I want to learn something different. That is why I selected this course."*

Another student had a similar idea.

> *"I wanted to learn something new, something not even taught in professional accounting courses... I have felt the importance of sustainability due to the internship training I received so far."*

Developing the case study was a novel experience for the students. Following the case study design approach of Yin (2009) the students were enlightened on developing case studies. In order to improve the students' commitment thirty percent of the marks were allocated for this assessment. The students had to develop a case study on EMA or SMA aspects of a selected organization. Due to the high academic quality maintained in these studies, eventually they were upgraded to journal articles which you will find in this First Issue of Journal of Accounting Panorama.

As a means of enhancing the student's involvement, I started maintaining a Facebook Group for the subject. Almost every student joined the group. It has been proven very effective in maintaining continuous communications with students even after the course unit was over. Some students shared interesting reading

material, images, videos, etc relevant to sustainability by posting those on the group.

As the pioneer in academic accounting education in Sri Lanka, the Department of Accounting triggered a difference in accounting education in Sri Lanka once again, through this course unit, I believe. It is expected that these various measures taken in the course would pave the way forward for the future graduates of the Department of Accounting to be conversant with the concept of sustainability.

Conclusions and future challenges

According to Tingey-Holyoak and Burritt (2012), at present, the majority of sustainability accounting skills and knowledge comes from external and internal training only and no skills and knowledge are being provided by universities. Yet, their research indicate that managers prefer sustainability accounting education to be received from universities, signifying the important role the universities will have to play in the future in this respect. Thus, I believe that Sri Lankan universities too should be proactive and incorporate sustainability accounting into their curricula. But, as highlighted by Tingey-Holyoak and Burritt there should also be a wider set of skill development initiatives in the areas of environment, engineering, science and other disciplines. This calls for trans-disciplinary approach for sustainability accounting education. In the future, the course unit we introduced will have to incorporate some vital aspects in engineering, architecture, physical sciences, etc to impart trans-disciplinary knowledge on SMA.

As highlighted by ICAEW (2004), sustainability presents a new focus for the accounting profession as the importance attached to environmental conservation and social responsibility increases. Further, it has been stressed as an opportunity for the accounting profession to demonstrate that it is on top of contemporary issues (Medley, 1997). However, sustainability accounting or education will not immediately result in solutions to the complex sustainable development issues, but will create much needed awareness and encouragement for sustainable business activities (Tingey-Holyoak and Burritt, 2012). The evidence suggests that accountants may be the very people who will embrace trans-disciplinary responses to calls for corporate sustainability. Then, as accountants, we can turn around in the future and say "we have made a difference to the world we live in" (Medley, 1997).

Like a spring, the beginnings of many things are small…

References

Bartolomeo, M., Bennett, M., Bouma J., Heydkamp P., James P. and Wolters T. (2000), Environmental management accounting in Europe: current practice and future potential, *The European Accounting Review*, Vol. 9 No. 1, pp. 31–52.

Bennett, M. J., Bouma, J. and Walters, T. (2002), *Environmental Management Accounting: Informational and Institutional Developments*, (Ed), Kluwer, Dordrecht.

Burritt, R. L. (2004), Environmental management accounting: roadblocks on the way to the green and pleasant land, *Business Strategy and the Environment,* Vol. 13, pp. 13–32.

Burritt, R., Hahn, T. and Schaltegger, S. (2002a), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review,* Vol. 12 No. 2, pp. 39–50.

Burritt, R. L., Hahn T. and Schaltegger, S. (2002b), "An integrative framework of environmental management accounting", In Bennett, M., Bouma, J. J. and Wolters, T. (Ed.). *Environmental Management Accounting: Informational and Institutional Developments*, Kluwer, Dordrecht, pp. 21-35.

Environmental Protection Agency (EPA). (1995), *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA, Washington.

Doody, H. (2010), *Environmental sustainability: tools and Techniques*, The Society of Management Accountants of Canada, the American Institute of Certified Public Accountants and the Chartered Institute of Management Accountants.

Drury, C. (2005) *Management and Cost Accounting*, Thomson Learning, New Delhi.

Geibler, J., Liedtke, C., Wallbaum H., and Schaller S. (2006), Accounting for the Social Dimension of Sustainability: experiences from the Biotechnology Industry, *Business Strategy and the Environment*, Vol. 15, pp. 334–346.

Gunarathne, A. D. N. and Lee K. H. (2014, forthcoming), Environmental Management Accounting (EMA) for environmental management and organizational change: an eco-control approach*, Journal of Accounting and Organization Change*.

Institute of Chartered Accountants in England & Wales (ICAEW). (2004), *Sustainability: The Role of Accountants*, ICAEW, UK.

Institute of Management Accountants (IMA). (1995), *Implementing Corporate Environmental Strategies*, IMA, NJ.

International Federation of Accountants (IFAC), (2005), *International Guidance Document: Environmental Management Accounting,* IFAC, New York, NY.

Jasch, C. and Stasiškienė Z. (2005), From environmental management accounting to sustainability management accounting, *Environmental Research, Engineering and Management*, Vol. 4 No. 34, pp. 77-88.

Lee, K. H. (2011), Motivations, barriers, and incentives for adopting environmental management (cost) accounting and related guidelines: a study of the Republic of Korea, *Corporate Social Responsibility and Environmental Management*, Vol. 18, pp. 39–49.

Medley, P. (1997), Environmental accounting – what does it mean to professional accountants?, *Accounting, Auditing & Accountability Journal*, Vol. 10 No. 4, pp. 594-600.

Sakai, K. (2007), "Ricoh's Approach to Product Life Cycle Management and Technology Development", In Takata, S. and Umeda, Y. (Ed.). *Advances in Life Cycle Engineering for Sustainable Manufacturing Businesses,* Springer, Netherlands, pp. 5-10.

Soonawalla, K. (2006), "Environmental Management Accounting" In Bihami, A. (Ed.), *Contemporary Issues in Management Accounting*, Oxford University Press; New York, pp. 380-406.

Tingey-Holyoak, L. and Burritt, R. (2012), "The Trans-disciplinary Nature of Accounting: A Pathway Towards the Sustainable Future of the Profession", In *Emerging Pathways for the Next Generation of Accountants*, Evans, E., Burritt R., and Guthrie, J., (Ed.). The Institute of Chartered Accountants in Australia, pp. 93-103.

University of Sri Jayewardenepura (USJ) - Faculty of Management Studies of Commerce (FMSC), (2012), *Faculty Prospectus*, USJ-FMSC, Colombo, Sri Lanka.

United Nations Division for Sustainable Development (UNDSD). (2001), *Environmental Management Accounting, Procedures and Principles*, New York and Geneva: United Nations Publications.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

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Managing Waste and Water with the Help of Environmental Management Accounting (EMA): A Sri Lankan Hotel Sector Case

Peiris T S M*, Dissanayake D M D D, Herath N T, Thanthree P K J

Abstract

Purpose –The study aims to examine how waste and water management practices along with EMA systems have been implemented by a Sri Lankan hotel.

Design/methodology/approach –Single case study method was adopted in the study. The main primary data collection method was unstructured interviews with open ended questions. Data were triangulated using other sources such as non-participative observation, informal conversations, perusing documents and inspecting physical artifacts. To improve the reliability, preparations were taken before the field visits and interviews. The collected data were analyzed thematically.

Findings – The hotel is in the forefront of implementing green practices among the Sri Lankan hotels. The approach is holistic and is at the center of management. The commitment of the founder and current chairman, increased regulation and voluntary certifications have driven the change for better management of waste and water over time. The key to successful green practices is stakeholder engagement while the key infrastructure needed for waste and water management is a good EMA System which is still at primary stage of development. The case demonstrates how the basic practices could result in better benefits if applied effectively.

Research limitations/implications –The findings of the research is based on a hotel context hence the recommendations best fit to the hotels with similar characteristics.

Originality/value –The study attempts to fill the gap of knowledge in the area of sustainability *and* waste and water management pertaining to the hotel industry, which is a key growth sector for many emerging economies including Sri Lanka. The results will be useful for better adoption of waste and water management and to develop a better EMA system for the hotel sector in emerging markets.

Keywords- Environmental management accounting; hotel industry; Sri Lanka; sustainability; waste and water management.

Paper type- Case Study

* Corresponding Author: E-mail: sankapeiris@yahoo.com

1. Introduction

Tourism is a developing industry and a key growth sector in the post war Sri Lankan economy (Ministry of Economic Development, 2011; Central Bank of Sri Lanka, 2012). To harvest the maximum benefits, Sri Lanka's tourism industry inevitably needs to adopt sustainability into their businesses due to reasons such as increasing adoption of responsible tourism globally, increased public awareness and media coverage of issues concerning environmental impact and growing demand for sustainable tourism (Miththapala *et al*., 2013). Despite the importance of sustainability practices in the hotel sector, Gunarathne and Lee (2013) state that research addressing sustainability in tourism industry is scarce in emerging markets.

On the other hand, Chung and Parker (2006) identifies that there is a need and opportunity for field base case studies that focus on investigating both historical and contemporary environment strategy and management controls employed by hotels. Motivated by this gap of knowledge, the researchers undertook this study based on the field of sustainability management in the hotel sector in Sri Lanka. Within the vast field of sustainability, waste and water management can be identified as one of the most visible areas in the hotel industry that initially triggered the need for responsible tourism globally (United Nations Environment Programme, 2003). While some researches on sustainability in Sri Lanka appeared after 2012, researches that specifically address waste and water management area in the hotel industry are scarce. Hence, this study aims to fill this gap by examining waste and water management practices of a renowned Sri Lankan hotel along with its EMA practices.

The hotel selected in the study belongs to a prestigious hospitality group in Sri Lanka and is considered one of the initiators of sustainable tourism in the country. The group commenced operations 40 years back in Negombo, an area known to be a key tourist hot spot in Sri Lanka. The hotel under study is situated in the same area, Negombo that amasses to a 9 acre land of golden sand facing the Indian Ocean. The hotel which was incorporated in 1973 went through a renovation in 2011 after which it was re-launched with 112 luxurious rooms, banquet halls and all other modern amenities. This stylish hotel was awarded the 5-star certificate in 2012.

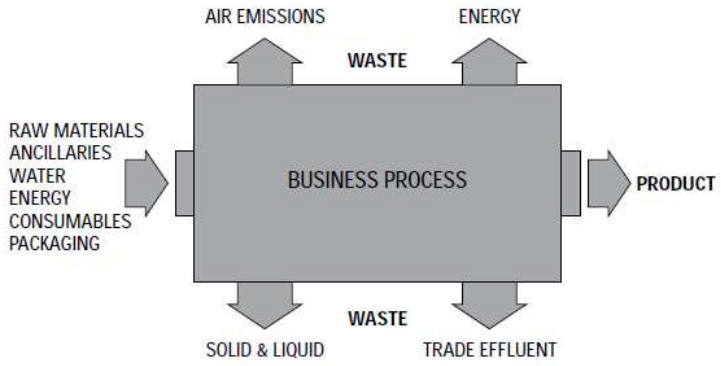
The rest of the paper is organized as follows: Section Two presents the literature review of the study which is then followed by the research methodology in Section Three. Section Four provides the findings and discussion while the last section presents the conclusions.

2. Literature Review

The main focus of this study lies on solid waste and wastewater management practices. The term waste is defined in many ways (Margaret, 1998; Michael, 2007; Sandberg and Bildsten, 2010). As per European Union's waste framework directive (1989), waste is defined as an object the holder discards, intends to discard or is required to discard. A more comprehensive definition is given by the UK Environmental Protection Act (1990) which defines waste as any substance which constitutes a scrap material or an effluent or other surplus substance arising from the application of any process; and any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled, but does not include a substance which is explosive.

Figure 01 illustrates a typical waste generation process that could be applied to any kind of an organization whereusually organizations feed raw materials, ancillaries, water, energy, consumables and packaging to the production process and it generates outputs which can be classified as productive outputs and non-productive outputs. Productive outputs are the finished goods and by-products with packaging. Non-productive outputs are air emission, energy waste, solid waste, liquid waste and trade effluent (Environmental Protection Agency (EPA), 1998; Margaret, 1998; IFAC, 2005). This simple illustration could be utilized in identification, analysis and management of waste which are discussed in later parts of the study.

Figure 01: Productive and non-productive output of an organization



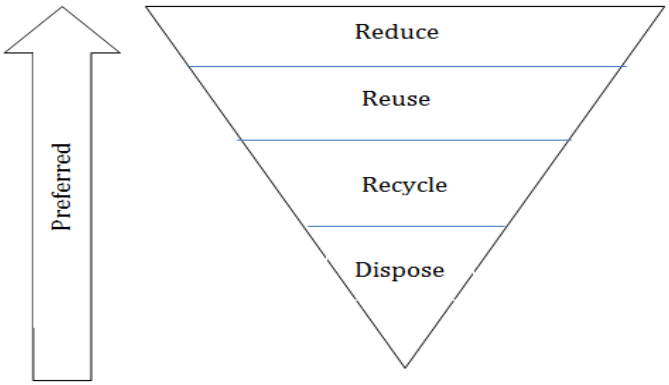
Source: EPA (1998)

Waste and water management in the hotel sector is of utmost important due to the high levels of wastage that could significantly impact the environment if not managed properly (United Nations Environment Program, 2003). Initially hotels used to dump solid waste to low-lying areas and release waste water to the sea,

rivers and other water steams through the drainage system. Reasons identified for these practices are financial constraints, lack of motivation in the corporation, absence of management and employee involvement in waste management. Even technologies such as composting which needs small capital investment were not initially practiced. However, improved environmental awareness, pressures from green customers and tightening of environmental regulations led hotels to be more environmentally friendly. As of now, green hotels have taken necessary actions to implement cleaner production and waste management systems more holistically (Jayawardana *et al.,* 2013).

An important tool that is being widely utilized in the area of waste and water management is the waste management hierarchy developed by the UK Governmentwhich is illustrated in Figure 02 (Her Majesty's Stationery Office (HMSO) as cited in Margaret, 1998). First version of the waste management hierarchy comprises of four main levels of waste management namely waste reduction, reuse, recycle, and disposal. Reduction is the first priority for more sustainable waste management, involving reduction or minimization of waste at source. Reuse involves putting objects back into use so they do not enter the waste stream. Recycle refers to the recovery of value or energy from waste materials. Further, this incorporates material recycling, composting and the recovery of energy from waste. Disposal is regarded the least attractive waste management option, usually involving landfill or incineration (Margaret, 1998).

Figure 02: **Waste management hierarchy**



Source: HMSO as cited in Margaret (1998)

With increased importance placed on the environment as discussed above, Environment Management Accounting (EMA) has emerged as an interface between management accounting and environment management (Bennett *et al.,* 2002).

International Federation of Accountants (IFAC) (2005) defines EMA as the management of environment and economic performance through the development and implementation of appropriate environment related accounting systems and practices. Bennett and James (1998) further state that it includes both financial and non-financial information.

When environmental considerations are getting ever important in accounting, conventional management accounting has been largely criticized due to its ignorance to separate identify, classify, measure and report of environmental information, especially environmental costs (Burritt, 2004). Furthermore, according to EPA (1995), EMA could classify environmental costs as *conventional*, *potentially hidden costs, contingent costs and image* and *relationship costs*. Conventional costs are costs of using raw materials, utilities, capital goods, and supplies and are usually addressed in cost accounting and capital budgeting. Potentially hidden costs can be upfront environmental costs (incurred prior to the operation of a process, system, or facility), regulatory environmental costs, voluntary environmental costs or back-end environmental costs (incurred at the end of the production cycle or facility). Contingent costs are those that may or may not be incurred at some point in the future such as the costs of remedying and compensating for future accidental releases of contaminants into the environment. Image and relationship costs are incurred to affect subjective perceptions of management, customers, employees, communities and regulators. Hence, as a branch of EMA, waste management also requires better a accounting and reporting system to back the efforts.

Inspired by the gap of literature of this important aspect of environmental management and the role of accounting, the study aims to examine how waste and water management practices have been implemented by the selected Sri Lankan hotel with the help of EMA. The next section explains the methodology followed in the study.

3. Methodology

This section discusses the data collection and analysis methods followed. Single case study method was adopted for the purpose of this research owing to the nature of the research question and the focus on the contemporary real life phenomenon in the study (Yin, 2009).

With the aim of collecting data, two site visits were made to the hotel. The first site visit was aimed at gaining a thorough insight into the current waste and water management practices. The Naturalist and the Chief Engineer at the hotel premises guided the visit with some insights from the General Manager as well. During the

first visit, physical evidence pertaining to the operation and maintenance of waste and water management practices were observed and examined. These included interviews with the Naturalist and the Engineer with further questions being asked for immediate clarification.

After some discussion and analysis on the practices observed from the first visit, a second visit, aimed at obtaining more information, was made after a lapse of a month. Another aim of this visit was to examine the EMA practices of the hotel, including details of the physical and monetary data being maintained. Also with this visit, details of the internal meetings held at the hotel and their effectiveness and specific management accounting techniques used for decision making in the area of waste and water management were obtained. The facts and knowledge gained from aforementioned parties allowed method and data triangulation.

Unstructured interviews consisting of open ended questions formed the main methodof primary data collection during these visits. This helped to gather a vast and novel array of information. Key consideration was paid to maintain the accuracy and reliability of the data through a triangulation process which has been emphasized by Yin (2009) when carrying out case studies. As a mean of triangulation, random employees from different levels were interviewed in addition to the interviews with the Naturalist and the Chief Engineer. Moreover, apart from the unstructured interviews, methods such as non-participative observation, physical inspection of artifacts were utilized as other means of triangulation. Secondary data sources such as daily and monthly material and energy records, official website, online information, Green Directory and various other documents were also analyzed.

Further, to maintain the validity of the data gathered, preparations were done before the second visit by way of listing down the required information rather than preparing specific questions. This is in-line with Yin's argument that construct, internal and external validity and reliability are prerequisites when carrying out case studies. This also helped to determine the length of the interviews where the conversation was maintained until the listed down expected information were gathered.

Thematic approach was used to analyze the collected data with regard to waste and water management practices, since theoretical propositions could be a good starting point for case study research as per Yin (2009). Hence, current practices of waste management were analyzed in the lines of waste management hierarchy of HMSO (1994). The next section presents the findings and discussion of the study along these themes.

4. Findings and Discussion

This section presents the findings and discussion of the study under drivers of change, current waste management practices, current water management practices, EMA system and challenges faced by the hotel.

Drivers of change

The hotel was built after considering some sustainability aspects when established in 1970's even during a period when sustainability was not popular among Sri Lankan hotels. Such practices were derived from the founder of the group who valued being environmentally friendly and promoted locality in providing employment opportunities and selecting suppliers. Later on, sophisticated green practices were adopted and other sustainability practices were gradually introduced as a result of a series of pressures and incidents the hotel underwent. Some water and waste treatment practices came into operation from external professionals and engineers who were hired by the hotel for some other technical projects. Their informal references to knowledge of such advanced practices gradually led the hotel to seek and adopt waste and water management practices. Another major trigger point was the appointment of the founder's son as the current chairman in 1987, who, armed with thorough knowledge on international hospitality practices, successfully implemented them within the hotel over time.

Later with increased regulation and voluntary certifications available, the hotel started implementing ad hoc standards such as HACCP. Today the hotel has integrated all such environmental practices into a coherent management system called the environmental management system and has successfully obtained certification as an ISO 14001 certified company in May 2013. Since then, the hotel's efforts towards sustainability are continuous and supported by professionals such as Naturalist and Engineers at the hotel premises.

The hotel first established the post "Naturalist" in 2010. Currently the post is handled by an expert who is reading for a Master's qualification with his first degree specializing in "wild life conservation and management", obtained from a local university. The main role of the Naturalist, who reports to the General Manager of the hotel, is to reduce or neutralize the carbon emissions. However, he is also involved with waste management, Corporate Social Responsibility aspects, nature/eco tours, and awareness programs and reporting. As identified by Moreno *et al*. (2004) and Gil *et al*. (2001) it is clear that the chain affiliation, accreditation and stakeholder environmental pressures have exerted a lasting influence on the implementation of environmental management practices by the hotel. These various pressures, accidental and intentional, have given rise to the current state of waste and water management practices which are discussed and analyzed henceforth.

Current waste management practices

In this section, all types of waste excluding water; air and energy are taken into account. The Naturalist at the hotel is responsible for the management of this area. The management practices are discussed and analyzed in terms of waste hierarchy (HMSO, 1994); i.e., waste reduction, waste reuse, waste recycle and waste disposal.

Waste reduction

The first step of the hierarchy is waste reduction which is an important step since this enables to avoid waste at source. The hotel's management has taken several steps to avoid waste at source.

Supply chain management of the hotel gives priority for the suppliers who follow sustainable practices, especially suppliers who avoid secondary covers and excess packaging of the goods. To highlight this preference the Naturalist says;

> *"When we select the suppliers, we look at their sustainable packaging practices… Always we give priority for those who offer environmentally friendly packaging."*

In addition, the hotel has displayed notices at receiving bay notifying a strict principle on usage of polythene when supplying raw materials. To support this, the staff has been given plastic crates to bring vegetables and other supplies from the market. Selecting vendors with easily recyclable packaging if the quality and other standards are met can also be considered as a mode of reducing waste.

There are other means of reducing the use of non-degradable materials. The hotel has set up a movable bottling plant at the hotel premises to clean and refill water. In this plant, plastic water bottles are 100% eliminated from the system and instead smart glass bottles are used. Moreover, the hotel has used wooden display boards and wooden cocktail stirs as well. In addition, organic paint has been used in most of the cases. As a green building practice, environmental friendly easily degradable clay tiles have been used instead of ceramic tiles. These practices highlight that the hotel has considered the life cycle impact in capital investment decisions, a requirement highlighted by Bennet and James (1998) and EPA (1995).

Waste reuse

Another important element in the waste hierarchy (HMSO, 1994) is the reuse of waste. In explaining their approach for waste reuse, the Naturalist during his explanation states;

> *"The first step of making use of any waste is to classify the types of waste and collect them separately."*

In-line with his statement, the hotel categorizes the waste as the first step to reuse. The hotel generates different types of waste, namely, solid waste, wet waste, hazardous waste and liquid and oil waste. Considering the above material types solid waste is further categorized and separately collected as glass, metal, paper and plastic in a small store room, adjoining the Sewerage Treatment Plant premises, named the "Resource Center".

50% of the wet waste is reused by a local piggery farmer for which, the hotel does not have any disposal cost. Oil waste is reused by selling to small vendors who manufacture detergent powder related products. Other solid waste such as metal and wood has been used to create ornaments and decorations for the hotel itself.

Waste recycle

As the next approach of the waste management hierarchy, the hotel recycles waste to a certain degree. For the recycling of the waste, a compost machine is used. This machine has been purchased irrespective of their financial feasibility and solely considering the sustainability aspect. This is because the plant that produces compost out of biodegradable waste has a pay-back period of more than 20 years and the financial benefits are negligible.

The machine is capable of producing compost mainly through the remaining 50% of the wet waste which is not being taken away by the piggery farmer. The compost generated by this machine is used for the hotel's organic and general gardening. Moreover, the compost is being distributed among schools and other charities as a CSR project.

Waste disposal

Another important aspect of the waste hierarchy is the waste disposal. The hotel chooses to dispose waste only if there is no other way to reuse or recycle. Hazardous and toxic substances are properly disposed taking health and environmental aspects into consideration. The housekeeping department of the hotel has to obtain the MSDS certificate (Material Data Safety Sheet) for chemical waste disposal. No chemical or chlorine is used in the swimming pool, and instead a salt related chemical process is followed. Monthly beach cleaning exercise that involves cleaning beach beyond the hotel plot is undertaken by the hotel with the help of neighbor hoteliers.

It is evident that the waste management of the hotel represents traditional end-of-pipe treatments as well as innovative approaches as suggested by (United Nations Environment Program and United Nations Industrial Development Organization, 1991). The next section presents the hotel's waste water management practices.

Current water management practices

The hotel uses water in areas such as guest bathrooms (for showers, wash basins, bath tubs and toilet cisterns), kitchens (for cooking, drinking water, food preparation, dish and pot washing), restaurants and staff canteens, common wash rooms (for wash basins, urinals and toilet cisterns), gardens (for gardening and landscaping), swimming pools and for make-up water, laundry, staff quarters and vehicle washing areas. An analysis of water consumption revealed that seventy five percent of the water is turned to be waste and very little portion is actually consumed. This situation requires better management of water and presents high potential for water saving. The hotel's water management practices have been analyzed based on the waste hierarchy (HMSO, 1994); waste reduction, waste reuse, waste recycle and waste disposal.

Water reduction

Water reduction practices can be identified as engineering and behavioral practices. The engineering practices represent the technical aspects used for reduction of water consumption. Practices such as replacement or installment of all toilets with low-flush fittings and bathrooms with low flush shower heads have enabled the hotel to reduce water consumption significantly. Conventional toilets use 3.5 to 5 gallons or more of water per flush, but low-flush toilets use only 1.6 gallons of water or less. Since low-flush toilets use less water, they also reduce the volume of wastewater produced. The hotel has installed paddling taps which has reduced the misuse of water drastically. Further, the installation of separate water meters enables the hotel to identify and account for the excess water use of each wing separately. This paves the way to investigate breakdowns in pipe lines and other damages immediately, enabling prompt recourse actions.

Showers account for about 20 percent of total indoor water use of a hotel. Replacement of standard 4.5-gallon-per-minute showerheads with 2.5-gallon-per-minute heads has reduced the hotel's indoor water consumption. The hotel has installed faucet aerators, which break the flowing water into fine droplets and entrain air while maintaining wetting effectiveness in sinks to reduce water. These are relatively inexpensive devices, yet effective in reducing water usage by as much as 60 percent while still maintaining a strong flow. The hotel has further focused on pressure reduction of fixtures and dip rinsing- cleaning dishes as a whole rather than cleaning them individually by hand. Above mentioned exercises are some of the engineering practices implemented to reduce the water consumption at source. As highlighted by Gunarathne and Lee (2013) these practices involve less investments but are applied with careful analysis with the help of guests and employees. The next section explains how the hotel receives the support of these stakeholders.

The behavioral practices involve changing water use habits so that water is used more efficiently, thus reducing the overall water consumption in the hotel. The hotel management has identified that these practices result in water conservation without zero investment through a change in behavior. Behavioral practices for water users can be applied both indoors in the kitchen, bathroom, and laundry room and outdoors. Therefore, the hotel has taken following measures to make an attitude change both among staff and guests.

The hotel conducts awareness programs for the staff that involve highlighting the importance of sustainable use of water through informing about the basics of water use efficiency; how water is delivered to them, the costs of water service, why water conservation is important, how they can participate in conservation efforts. The water savings from the employees are rewarded back to staff welfare fund. This involves rewarding the staff through directing savings yield from sustainable use of water directly to the staff welfare fund. To highlight how the fund operates the Engineer during an interview stated;

> *"All the proceeds of savings of waste water are credited to employee welfare fund... this gives them a sense of ownership."*

The hotel uses the Green Directory to increase awareness of the guests on its sustainability practices. All guests are provided with one such directory that summarizes hotel's green practices and includes requests to conserve water and reduce waste. Moreover, displays and quotes have been exhibited in different places such as tissue papers, bathrooms and rooms etc in considering the potential contribution that can be made through merely changing attitudes to reduce water without any investment.

Water reuse, recycle and dispose

Once the water is used, it is often considered as waste water. Hence, any relevant practice to reuse should be subject to treatment and discussed under water recycling. The recycled water is reused for gardening and for maintenances of land. The recycling of water is done at Sewerage Treatment Plants**.** Engineering division has identified and considered following factors when implementing the Sewerage Treatment Plants.

- Identification of water reuse opportunities
- Evaluation of the minimum water quality needed for a particular use
- Evaluation of water quality degradation resulting from use
- Determination of the treatment steps, if any, that might be required to prepare the water for recycling

The hotel has established two Sewerage Treatment Plants representing two techniques called Aerobic and Anaerobic. The difference lies in the biological digestion method where the treated water is used for gardening purposes. This not only reduces a larger water usage but it also prevents the environment and ground water system from having to absorb polluted water. The sludge, the by-product of the process, is used as organic fertilizer. Waste water is only disposed if it is hazardous and cannot be used after any treatment. The disposal of hazardous toxic waste water is carried out through the municipal council.

The next section describes how the hotel operates an EMA system for water and waste management.

EMA system

The EMA system of the hotel relating to waste and water management comprises of measuring water and waste data, calculating integrated performance measures and reporting of the data. It was identified that the level of sophistication of the accounting system is very low and basic. The Finance/Accounting team is little involved with the operation of the environmental information system. They are involved with only issuing and receiving receipts relating to environmental costs. The engineering division is responsible for major part of the environmental information system as information pertaining to energy and water is collected and managed by them. The Naturalist is responsible for waste related data.

According to Burritt *et al*. (2002) EMA systems collect data on physical and monetary aspects. Some of the physical data collected in the hotel pertaining to the water and waste management are: water units for each of the department, number of waste bins issued for piggery farmers, number of wet waste bins issued for compost machines, kilograms of e-waste, kilograms of waste paper sold, kilograms of glass waste, etc.

The monetary data pertaining to the waste and water management include the monthly water bill, chemicals costs for Agronova machine, operating costs of Agronova machine and sewerage treatment plants etc.

Waste and water management costs (environmental costs) are not separately identified or categorized from other non-environmental costs. All environmental costs are treated as general overheads. For example a major part of the engineer's time is spent on managing and overlooking waste treatment plants, water management etc. But it is not separately identified as an environmental cost. This observation is clearly in line with the argument of Burritt (2004) and IFAC (2005)

which states that non-identification of environmental costs act as a major barrier for the better implementation of environmental management accounting.

In the area of water, water consumption per guest is reported. In addition, water consumption is compared with occupancy. In the area of waste, no such integrative measure is calculated, rather the number of waste bins disposed is considered. Further, the hotel does not separately treat environmental costs but consider those as general overheads. No Activity Based Costing practice was noticed in the area of allocating these waste related costs (EPA, 1995; Soonawalla, 2006).

Environment related projects that involve considerable capital expenditure are evaluated based on pay-back period (EPA, 1995). Few examples were compost machine, sewerage treatment plants and solar panel systems. However, compost machine which gave a pay-back of more than 20 years was installed irrespective of the financial feasibility. Engineering team is predominantly involved in identifying costs and incomes relating to a project appraisal since such projects are technical savvy. The accountant takes part in attributing financial values together with the engineer. However, discounted pay-back is not utilized. Only direct financial income and expenses are considered for this appraisal. A larger societal benefits and costs are neglected in environmental project evaluation which makes most of the projects financially not feasible (EPA, 1995)

When considering the reporting system adopted by the hotel it was identified that it conducts three main meeting relating to sustainability. These meetings are daily morning meetings, monthly green directory meetings and engineers' meetings. These meetings provide and shape the reporting frequency and the structure of environmental information. The daily morning meetings are conducted by the General Manager where all department heads such as maintenance and engineering, housekeeping, administration and human resource, front office, laundry, accounting, spa and gym and kitchen participate along with the Naturalist. Previous day's data relating to water and energy are discussed and in case of any abnormal usages the respective department heads are questioned. Usage is often compared with the occupancy. In the monthly green directory meeting, waste and overall sustainability is discussed and analyzed critically. Monthly water consumption compared to occupancy, waste data and energy usage are important focus areas that are usually subject to the discussion in these meetings. Finally, in the engineers' meetings engineers report data relating to energy and water usage. Long term solutions are also discussed in these meetings. It is clear that the reporting framework of the hotel by means of meetings is due to chain affiliation as suggested by Gil *et al.* (2001).

Challenges faced by the hotel

The practices discussed in previous sections, actions are not without challenges. From management perspective, waste and water management and sustainability is at the center of hotel operations. However, the main challenge against holistic implementation is the engagement of all stakeholders to a greater extent (Gunarathne and Lee, 2013).

Stakeholders such as guests, employees and suppliers, who have a greater bearing on waste and water management, are aware of the hotel's sustainability movement to a greater extent. The hotel usually does not accept any polythene bags from suppliers when receiving vegetables and other supplies. Instead, staff has been provided with plastic crates to bring such supplies from market. Amidst such good practices being established, vegetables in polythene bags are seldom noticed at the receiving bay as all other vegetables are received in cartons. However, it is evident to different departments that stakeholders although aware, tend to forget the norms and values over time due to lack of continuous emphasis and control. The naturalist admitted by saying;

> *"This is the challenging part, no matter how we advise them, when we are not present they tend to neglect."*

Another source of waste generation hotel has identified is the level of education of employees which makes it harder to convince the benefits of the concept vis-à-vis the busy routine schedule they have to follow. Moreover, it was evident that the hotel does not have the control over a major part of waste as guests have a huge bearing in the area unlike employees who could be controlled to a greater extent. The Naturalist of the hotel commented;

> *"Some guests are not reacting to the whole sustainability movement and they have the mentality of consuming the maximum for the amount they pay, for an example every time you flush a cigarette butt, facial tissue or other trash, three to four gallons of water is wasted."*

This statement of the Naturalist highlights the challenge they face when managing guests which has also been observed by Gunarathne and Lee (2013).

Further, the hotel tries to eliminate secondary packaging in receiving goods and supplies to stores as much as possible. Nonetheless, due to the practical difficulties the hotel has to buy goods with the secondary packaging in certain situations such as when buying in bulk. According to the naturalist, another challenge faced by the hotel is eliminating polythene completely or recycling them. It is not feasible to put up a polythene recycling plant in account of lesser quantity and higher capital costs against financial benefits. Moreover, delivering the polythene waste to local

recyclers, the next best alternative also has higher implications on transportation cost and carbon emissions which in turn contradict with the hotel's motive to be a carbon neutral entity.

5. Conclusions

The case demonstrated that the waste and water management practices are holistically established in the hotel, at times, irrespective of their financial feasibility. The continuous application of these environmental practices is now certain owing to a series of events which took place after 2011 including the major renovation and receiving of ISO14001 certification. Further, the hotel is highly committed and equipped with greater top management support and posts such as naturalists and engineers at the hotel premises. The greatest challenge to the waste and water management is the engagement of guests and employees in the process who account for a massive portion of the usage. However, advanced and creative methods such as reward systems, to engage the stakeholders, guests and employees are yet to be adopted that would lead the hotel to perfection along with continuous effort. On the other hand, to support all of these good practices, the need of a sophisticated EMA system is increasingly felt. Yet, the hotel has been able to implement environmental strategies to a greater degree of success. Thus, the case again confirms the findings of Gunarathne and Lee (2013) that simple and less sophisticated systems could still be effective if applied with consistent commitment.

The hotel can further strengthen the waste and water management strategies by stakeholder engagement, continuous physical investment and effective establishment of an EMA system. For effective stakeholder engagement, especially guests, an Eco-Voucher system. This would be conducted to reward the guests who support the hotel's sustainability movement by way of free stay-over in any hotel in the group in recognition of the savings they make. On the other hand Eco-Circles could be implemented and strengthened for employee involvement and empowerment to support sustainable practices. In the area of further physical investments, the hotel can re-look at further green building, elimination of polythene use, polythene recycling and other investments. At the same time, it is crucial to establish a proper EMA system that can properly identify and would facilitate all other sustainability initiatives such as Eco-Vouchers and Eco-Circles.

Though the findings of this study are useful for hotel sector organizations to manage waste effectively, there are some limitations involved. Among them, the difficulty in generalizing, limited number of interviews involved and the context specificity are important. The researchers took various measures to mitigate these issues. Yet, in the future, more research is needed covering hotels of other

geographical locations, star categorizations and sizes to get a deeper understanding of waste management practices of the Sri Lankan hotel sector.

References

Bartolomeo, M., Bennett, M., Bouma J., Heydkamp P., James P. and Wolters T. (2000), Environmental management accounting in Europe: current practice and future potential, *The European Accounting Review*, Vol. 9 No. 1, pp. 31–52.

Bates, M. and Phillips, P. (1998), Waste minimisation in food and drink industry, *Nutrition & Food Science*, Vol. 6, pp. 330-334.

Bennett, M. and James P. (1997), Environment related management accounting: current practice and future trends, *Greener Management International*, Vol. 17, pp. 33–51.

Burritt, R. L. (2004), Environmental management accounting: roadblocks on the way to the green and pleasant land, *Business Strategy and the Environment,* Vol. 13, pp. 13–32.

Burritt, R., Hahn, T. and Schaltegger, S. (2002), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review,* Vol. 12 No. 2, pp. 39–50.

Central Bank of Sri Lanka (CBSL). (2012), *Annual Report 2012*, Central Bank of Sri Lanka, Colombo.

Chung, L. and Parker, L. (2008), Integrating hotel environmental strategies with management control: a structuration approach, *Business Strategy and the Environment,* Vol. 17, pp. 272-286.

Environmental Protection Agency (EPA). (1995), *An Introduction to Environmental Accounting as a Business Management Tool: Key Concept and Terms,* EPA, Washington.

Environment Protection Act (1990), United Kingdom, retrieved on 12.02.2013 via http://www.legislation.gov.uk/ukpga/1990/43/contents.

Gil, M., Jimenez, J. and Lorente, J. (2001), An analysis of environmental management, organizational context and performance of Spanish hotels, *Omega*, Vol. 29, pp. 457–471.

Gunarathne, N. and Lee, K. (2013), Adopting and Implementing Environmental Management Accounting (EMA) Practices in the Hotel Sector: A Sri Lankan Case, A paper presented at the EMAN Global Conference, Gold Coast, Queensland.

International Federation of Accountants (IFAC), (2005), *International Guidance Document: Environmental Management Accounting,* IFAC, New York, NY.

Jayawardana, C., Pollard, A., Chort, V., Choi, C. and Kibicho, W. (2013), Trends and sustainability in the Canadian hospitality industry, *World Wide Hospitality and Tourism Themes,* Vol. 5 No. 2, pp. 132-150.

Laughlin, B. and Linda, K. (1991), Accounting for waste or garbage accounting: some thoughts from non-accountants, *Accounting Auditing and Accountability Journal*, Vol.4 No. 3, pp.43-50.

Margaret, P. and Paul, S. (1998), Waste minimization in the food and drink industry, *Nutrition & Food Science,* Vol. 96 No. 6, pp. 330-334.

Ministry of Economic Development (MEDSL). (2011), *Tourism Development Strategy 2011 – 2016,* MEDSL, Sri Lanka.

Miththapala, S., Jayawardena, C. and Mudadeniya, D. (2013), *Worldwide Hospitality and Tourism Themes,* Vol. 5 No. 05, pp. 442-455.

Moreno, E., C., Lorente, J. S. and Jime´ Nez, J. D. B. (2004), Environmental strategies in Spanish hotels: contextual factors and performance, *The Service Industries Journal*, Vol. 24 No. 3, pp.101–130.

United Nations Environment Program and United Nations Industrial Development Organization (UNEP & UNIDO). (1991), *Audit and Reduction Manual for Industrial Emissions and Waste*, UNEP & UNIDO, Paris.

United Nations Environment Programme (UNEP). (2003), *A Manual for Water and Waste Management: What the Tourism Industry can do to Improve its Performance*, United Nations Publications, France.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

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Application of Sustainability Management Practices in Newspaper Printing Industry: A Sri Lankan Case

Nanayakkara C O*, Paranawithana M R, Nimalashantha N M M P, Randula E D L, Kannangara K K H L

Abstract

Purpose - The purpose of this study is to examine the current environment management accounting practices and concept of cleaner production relating to one of the major media firms, a news paper printing company, in Sri Lanka.

Design/ Methodology/Approach - The case study method was followed in the study. The primary data were collected mainly by face to face unstructured interviews and telephone interviews with the General Manager and the Operations Manager of the site. In order to get further clarifications, email communications were also made. In addition, the researchers visited the factory and collected data through observations. Secondary data were gathered by browsing web site sources, internal company records, presentations done by the General Manager, etc. Multiple data gathered were analyzed by creating data flowcharts and tabulating the frequency of different events (Quantity wise and monetary wise).

Findings - The study illustrates that the news paper printing company has successfully implemented many environmental management accounting and cleaner production practices as a cost saving strategy. Due to the correct application of the environmental accounting practices, the company was able to become a top ranking company in small and medium sector. Further, this study confirmed some general practices can be further converted in to environmental accounting practices with precise guidance and continuous following.

Research Limitations/implications – The findings of the study would be difficult to generalize since the study is based on one particular company in the media industry in Sri Lanka which applies EMA & CP practices. Further, the study has focused only on EMA & CP strategies relating to material and water in the selected company in order to minimize the complexity of analyzing information.

Originality/Value: This study is useful to understand how a company can use CP strategies and EMA practices to increase the productivity and efficiency in a competitive environment.

Keywords: Cleaner Production; Environmental Management Accounting; News paper printing company; Sri Lanka.

Paper Type: Case Study

* Corresponding Author: Email: oshancnanayakkara@gmail.com

1. Introduction

Accounting profession is now facing the challenge to account for the environment not only through its traditional role of recording and reporting financial information, but also through its role to manage environmental performance. Environmental accounting, which can assist in meeting this challenge, is an inclusive field of accounting, but it represents a broader term that relates to the provision of relevant firm-level environmental performance information to internal and external stakeholders (Bennett and James, 2000). Environmental Management Accounting (EMA) has gained increased recognition as a management tool that assists in improving financial and environmental performance through enhanced environmental accountability. Companies and managers usually believe that environmental costs are not significant to the operation of their businesses. However, current competition in the business world force companies to reanalyze the cost structure since some production costs can be reduced significantly by adopting EMA and cleaner Production (CP) practices. For instance, the purchase price of raw materials- the unused portion that is emitted as waste - is not usually considered as an environmentally related cost. These costs usually tend to be much higher than initial estimates (if estimates are even prepared) and should be controlled and minimised by the introduction of effective cleaner production initiatives whenever possible. By identifying and controlling environmental costs, EMA systems can help environmental managers to justify these cleaner production projects since it helps to minimize waste and emissions and maximize product output, and identify new ways of saving money and improving environmental performance at the same time.

One of the main tools of EMA is material flow cost accounting, a management tool that can assist organizations to better understand the potential environmental and financial consequences of their material and energy practices. Furthermore, it seeks opportunities to achieve both environmental and financial improvements via changes in energy management including planning and operation of energy-related production and consumption units and water and wastewater management. This is achieved through planning, developing, distributing and managing the optimum use of water resources and planning to minimize and treat wastewater. Various industries have been included in these EMA-related researches and studies in the past, and this study examines the experience and effectiveness of implementing EMA practices and concepts of cleaner production related to one of the major media firms in Sri Lanka; a news paper printing company.

The particular news paper printing company was established in 1979 and is now the leading newspaper group in Sri Lanka, recording the highest annual turnover by claiming 70% of market share in the Sri Lankan newspaper industry. The company operates with a vision of “Being the most independent and socially

responsible media group in Sri Lanka, upholding freedom of expression and protecting the right of the individual through journalistic excellence" and with a mission to provide timely and comprehensive information, to everyone, wherever they are and report facts as they are, while providing a forum for the public to discuss issues of importance and interest. Currently, the group publishes six newspapers, five weekly papers and five magazines. The company maintains two main printing plants in two locations, one in a residential area and the other in a highly urbanized area, for which environmental friendliness is extremely important. Out of these two plants the plant located in the residential area produces more than 80% of their demand.

The company has won several newspaper industry awards such as Editorial Guild Awards and Collets Awards and also SLIM Nelson Peoples Award for the most famous newspaper in the island. Apart from wining these industry awards, the printing plant in the residential area has won several awards for maintaining a high quality production while keeping the efficiency and effectiveness of the operations. These awards are; National Cleaner Production Awards-2009 (2009) given by National Cleaner Production Centre – Sri Lanka, Silver Award in recognition of excellence in cleaner production practices in manufacturing – Small & Medium Organization Category, Special award in recognition of achievements in material efficiency in manufacturing, Special award in recognition of achievements in water efficiency in manufacturing – small & medium organization category, Global Chemical Leasing Award 2010 – Certificate for applying and Promoting Chemical Leasing, National Productivity Awards 2009 -3rd Place in the Western Province, and National Quality Circle Awards – 2009 – Certificate.

The rest of the paper is organized as follows. Section Two presents the literature review of the study which is then followed by the research methodology in Section Three. Section Four provides the findings and discussion. The last section provides the conclusions.

2. Literature Review

Despite the various actions of organizations to be good citizens, the concept of "sustainable" businesses is relatively new. There are different methods to operationalize sustainability within organizations (Linnenluecke and Griffiths, 2010). Mirvis and Manga (2010) have identified two models used to integrate citizenship into sustainability of organizations; the top down approach and the catalytic approach.

Beyond doubt, management accounting practices are affected by these sustainability issues. Sustainability, specifically sustainable development, is defined as meeting the needs of the present without compromising the ability of

future generations to meet their own needs (World Commission on Environment and Development, 1987). Sustainable management has been defined as the application of sustainable practices in the categories of businesses, agriculture, society, environment, and personal life by managing them in a way that will benefit current generations and future generations. It is clear that accounting is now facing the challenge to account for the environment not only through its traditional role of recording and reporting financial information, but also through its role to manage environmental performance (Hopwood, 2009; Schaltegger and Wagner, 2006). However, prominence has been placed on environmental aspects when compared to social aspects in sustainability. EMA has attracted increasing attention and interest as a support mechanism to manage environmental performance, which in turn helps to improve financial performance (Bouma and Van deer Veen, 2002; Gray and Bebbington, 2000). There is no universally accepted formal definition for EMA. However, various bodies and individuals have defined EMA based on different perspectives. According to Bennett and James (1998) EMA is the generation, analysis and use of financial and non-financial information in order to optimize corporate environmental and economic performance and to achieve sustainable business. EMA ensures business organizations are concerned about the impact of corporate activities on the environment and the costs of such environmental impacts (Burritt, *et al*., 2002). Environmental related cost concepts such as conventional costs, potentially hidden costs, contingent costs, image and relationship costs etc. have emerged as inputs to conventional management accounting. The studies have shown that particularly the developed countries have focused on incorporating EMA into conventional accounting as a sustainability approach. For instance, many Australian local governments practice EMA due to social structural influences and organizational contextual influences reflecting situational needs such as complex waste operations, uncertainties in waste and recycling management. (Qian, *et al*., 2011).

EMA practices are mostly observable in the manufacturing sector. Newspaper printing industry is one such sector where EMA practices are applied all around the world due to the fact that more waste is generated throughout the process of printing. It is important to ascertain whether there are, any potential health or environmental implications associated with the industry (Tucker, *et al*., 1996). In the past, concern was expressed about the levels of heavy metals used in the process, though nowadays both the industry and environmental organizations agree that these may no longer be a problem (Anon, 1991). There have been significant increases in the amount of colored inks used in newspaper publishing, and the environmental and health implications of this change have not yet been addressed. It is important, if only for reassurance, to consider any possible issues that may be raised. Concentrations of all detectable metals, notably copper and zinc, varies widely amongst individual newspaper titles and even more so amongst

individual magazine titles, possibly because of the variability in ink loadings, fillers and coatings (Tucker *et al.*, 1996). Primary sources of the heavy metal wastes of printing are from additives to paper making (Hamm, *et al.*, 1986; Simon, *et al.*, 1997), impurities in pigments from some manufacturers or from corrosion in the paper mill.

The composition of pollutants in waste water of paper industries, depend on the kind of raw material used. Well-functioning water and waste water services are basic requirements for all human activities (Shafqat, 2010). Therefore, wastewater must be treated and disposed of or discharged into a naturally occurring water source. The waste water from industries requires collection, treatment and disposal in accordance with local, state and federal standards (Theodore and Theodore, 2009).

Commitment to sustainability is a relatively new phenomenon in organizations (Stoughton and Ludema, 2012). Therefore, it is highly important for the organizations to adopt sustainability practices and maintain systematic measurement and monitoring mechanisms for such practices. This fact is particularly important for the industries like newspaper printing in order to enhance the value adding services they provide to the communities at large by minimizing the negative impacts towards environment and community.

3. Methodology

The case study method was followed since the research question is of qualitative nature (Stake, 2006). The company consists of two main printing plants, one in a trade zone and another in a residential area. The plant located in the residential area practices EMA to a greater extent. Thus, it was selected for the study. The printing plant uses mainly four types of material i.e., newsprint, ink, plates and fountain. Newsprint is the major cost driver for the company, while the fountain at the end of the printing process will be a key risk factor to the environment if not taken care of. Therefore, more attention has been paid to these two inputs in the study.

Prior to visiting the site, the web site of the organization and other documents available online (EMA reports published, newspaper articles, other related blogs, etc.) were studied in order to understand the milestones and recognitions received by the organization in relation to EMA practices. For the purpose of collecting further data, the particular printing plant of the company was visited. Initially, data regarding the plant and its printing process were collected from the presentations done by the General Manager of the plant. Further, the full printing process from the point of material arrival till treatment of wastage as outputs was observed during the site visit.

During the next site visit, face to face unstructured interviews were conducted with the General Manager of the printing plant, the Operations Manager of the site of the particular shift and two more core staff members (machine operators). These interviews covered mainly the newsprint and fountain treatment from the beginning to the end of the process including types of material flows, how and where wastage occurs, monetary and physical terms of wastage, wastage management practices, potential risk factors and planned initiations for the future. Thereafter, findings of the interviews were triangulated with observation (by two more site visits) to ensure consistency and credibility. More attention was paid towards Paper Print, Reel Butts and Fountains during the final two visits. Further, snapshots were taken as evidence with approval from the company management.

The organization uses quality control circles and management programs in order to address each strategic issue specially related to the management of material wastage, water wastage, energy, etc. These teams are made responsible to meet the waste management targets whilst keeping proper records. A document analysis was conducted by reviewing the contemporary records and historical records kept by such teams relating to material and water wastage. Using emails and telephone conversations with the General Manager of the plant further clarifications were obtained.

Multiple data gathered was analyzed descriptively by creating data displays (flowcharts and other graphics), and tabulating the frequency of different events (quantity wise and monetary wise) separately for Newsprint and Fountains. The descriptive analysis was then incorporated into thematic analysis of data. The next section provides the findings and discussion of the data analysis.

4. Findings and Discussion

This section presents the findings and discussion under two themes i.e., organizational transformation and success of the sustainability practices and current sustainability and accounting practices.

Organizational transformation and success of sustainability strategies

The following section identifies why the news paper printing establishment was inspired to follow EMA practices, how the change actually took place in the company, and the measures the company take to sustain and continuously upgrade its practices. The section finally identifies the challenges the company encounters or encountered in this process.

Inspiration to adopt the EMA practices

The printing plant, currently considered to be the main plant of the company, started its operations in the year 2007. The stepping stone towards EMA was initiated by the General Manager of the Printing Plant. As he had studied the importance of using the natural resources without harming the future generations' needs, the EMA practices were initiated at the printing plant under his guidance. Through proper leadership, the company was able to achieve major cost savings while being sustainable towards the environment. Prior to the present General Manager's appointment, the company was carrying out its operations similar to other companies in the country, without paying much attention towards EMA aspects such as the usage of energy, material, water and generation of various types of waste. However after receiving proper leadership under the new General Manager, the company was going through a drastic change in terms of EMA adoptions. The company was able to obtain enormous cost savings while being environmentally friendly at the same time. The printing plant was able to set up an example to the whole group of companies of the importance of conducting operations in an environmentally friendly manner, thereby attaining cost savings leading to an improvement to the bottom line.

The printing plant, with proper direction from the General Manager, commenced various programmes to achieve its objective of carrying out its operations in a manner that do not deprive future generations of satisfying their needs (Brundtland Report, 1987). The below section discusses how it manages its material and water consumed in an environmentally friendly manner. It specifically describes how the "Newsprint" material is being managed by the company together with water management, thereby leading it to be successful in its EMA adoptions.

Process of implementing EMA practices, and the organizational transformation

The company initiated an environmental policy with regards to its operations with the aim of achieving major cost savings by managing the material and water utilized in the production. In order to achieve the reduction in material wastage and the waste water generation, this particular printing plant focused on carrying out a root cause analysis, enabling it to identify the cause to waste. This root cause analysis was done with the aid of quality circles inclusive of well trained personnel in managing wastage, who were able to address the issue properly and manage the waste accordingly. The people involved were well trained through providing a series of regular proper trainings in managing wastage. In the newspaper industry, the benchmark standard for waste is considered to be within the range of 4.5% to 5%. However at the particular printing plant this target is further tightened to 3% of the total production. With the help of quality circles, various types of waste in the production such as "Scum", an uncontrollable waste relating to water and ink,

newsprint waste have been identified. To confirm the General Manager of the Printing Plant says:

> *"All of these were implemented as part of achieving the ISO 14000 accreditation. Furthermore as part of housekeeping development, the company has also implemented the Japanese concept of 5S, which has resulted in many benefits to the organization and to its employees."*

With this type of environmentally friendly initiatives the employees also realize the importance of conserving the resources for the benefit of future generations, thereby taking the sustainability message to their families and relatives; hence, leading to a major social service.

With the implementation of the cleaner production concepts the company emphasizes on the importance of being environmentally friendly, and this message is further pressed on to the factory staff as well, by disclosing to them of the fact that in order to create one ton of paper, 14 well grown trees need to be cut down, thereby making them very much cautious when handling material during production. The Printing Plant started its CP initiatives with 3R concept, which stands for "Reduce, Reuse and Recycle".

Moreover, the company has taken great measures in conserving water and treating waste water for reuse, which has eventually resulted in a saving of 296,400 liters of water annually. Similar to material waste, even for water, with the use of quality circles, a root cause analysis has been carried out in order to find the major factors that cause the generation of waste water. The Operations Manager during an interview says:

> *"We have taken various initiatives in order to manage the waste water generation such as using a water treatment plant in order to treat waste water so that it can be reused."*

His statement highlights level of concern they have towards the waste water management. During this process, various chemicals are added for the purification of water, which then generates water that can be even used for drinking. However, this treated water is only used for gardening in the premises and other cleaning activities as the company greatly considers the good health of its employees.

One of the most important aspects of energy saving relates to the electricity usage and at the plant, a large amount of energy is being saved as it uses natural lights during day time. Moreover, the printing facility also uses natural ventilation within the premises. All of these are part of EMA practices and result in valuable cost savings for the company while being environmentally friendly.

Efforts taken to sustain the improvements

The plant has taken various initiatives to sustain these practices. The General Manager in an interview says:

> *"The concept of Kaizen, which means continuous improvement, is one that is greatly appreciated at the printing plant. In order to achieve continuous improvement and sustain the developments achieved this far, the company carries out various management programs covering many fields."*

The statement of the General Manager emphasized the attention they have devoted to sustain and improve these practices. Regarding the main material utilized in the process, which is the "Newsprint" the company firstly analyzed how much "News print reel butts" are required in the production and the amount of wastage generated through the process. Significant importance is given for the material "Newsprint" as it is the main cost driver of the printing plant. Thereafter the company decided on an objective to reduce the Newsprint material wastage by 10% of its total usage. In order to achieve this target, the management of the company set up a particular team with a leader who is the Operations Manager and rest of the members from various backgrounds, such as supervisors and factory staff. This team's activities were monitored and authorized by the General Manager of the company, who initiated this management program.

This management program to reduce the "Newsprint" material waste had begun with a specific vision of being sustainable in operations for the goodwill of the future generations. The team initially carried out a brainstorming activity in order to identify what measures could be taken in order to achieve the set target of reducing waste by 10%. Through the brainstorm activity various suggestions were proposed, namely notifying the factory staff to be mindful when handling the material in the process, (such as advising on the maximum use of material reel butt that is used in the news printing, which will reduce the amount of material wastage), reducing the amount of operator faults in machine handling, providing training to the staff to improve their skills and capabilities and so on. After obtaining the suggestions, by specifying weights, the management, together with the team, decided on what can be implemented from the listed suggestions.

After determining the activities to be conducted in terms of achieving the target of reducing 10% of material news print wastage, the management carried out various training programs to the factory staff of different departments of the Printing Plant, such as the stores staff, printing division's staff, etc. Thereafter, as part of this material reduction initiative the company also devised plans of displaying various notices to the staff to keep them informed about being cautious when handing material and also to be alert on the reduction of material waste. All of these

proposals enabled the company to achieve a saving with regards to material news print reel butts amounting to Rs.6,578,628. Therefore, encouraged by this management program relating to newsprint material, various other management programs were initiated to save materials such as water (fountain), ink, plates used in printing, etc.

Similar to news print material management, many measures were taken to manage the water used in the production as well other activities within the factory. Some of the suggestions that were proposed during the brainstorming activity carried out relative to the water management program includes, determining the possibility of reusing the water consumed for plate washing during printing cycle, controlling tap water consumption, usage of sensor controlled taps, reducing the water leaks as far as possible, taking the maximum usage of the treated water and encouraging employees to use a glass water bottles for drinking water, which will further reduce the waste of water. Upon these suggestions, tap water control, foot control taps, water control in toilets have been successfully implemented, resulting in a saving of Rs.116,842 annually as per the latest data obtained. In order to sustain the EMA adoptions company's management encourages carrying out such management programs in the future as well, as they do not focus on incurring high capital expenditure, but on simple improvements towards sustainable operations.

Challenges encountered in the process of establishing EMA practices

The implementation of these practices has not been without hurdles. The Operations Manager says:

> *"When carrying out these environmentally friendly initiatives we had to undergo many challenge… especially the General Manager who took the proactive approach of being environmentally friendly in the production had to go through many challenges posed by the management and the staff."*

His statement highlights the challenges have come from management and staff. Concerns from higher management, in particular, regarding whether the green initiatives would provide the expected cost savings had to be addressed. However, most of these challenges were well managed by proving results obtained via the EMA adoptions, particularly by presenting in terms of monetary value terms. It was even more challenging to manage the factory staff with regard to these initiatives due to their low levels of education.

Nevertheless, continuous training and awareness programs aimed at the staff persuaded them to understand the importance of proper material management, water conservation and environmental friendly operations for the ultimate benefit

of future generations. Both the General Manager and the Operations Manager make a similar statement regarding their approach for continuous improvement:

> *"The most important aspect of being successful is the strong commitment for the various EMA adoptions from all employees of the organization, from the General Manager to the factory workers."*

Furthermore, in order to retain the commitment especially from the factory staff, the company continues to encourage them by rewarding their efforts monthly.

Current sustainability practices and accounting aspects

The printing plant has won the National Cleaner Production Award, Silver Medal for three consecutive years in Small and Medium company sector. This was achieved as a result of continuous implementation of EMA and CP practices. In the year 2012, company was able to save Rs.38.5 million to the company, of which 76.2% was saved by following CP practices in the areas of material and water. The company has followed several strategies to save material which was their main input to the production process and water which is one of the most valuable resources to the entire world population. These strategies are explained below.

Material

The Printing Plant has followed several technical strategies to curtail the material wastage including; reducing Computer to Plate (CTP) Dimension, introducing CTP baking machine, reducing the Diameter of the reel butt, introducing printing machines which have ink injectors.

Computer to Plate (CTP) Dimension

According to the global standards, dimension of a CTP was 750 x 576mm. Under this global standard company used 62,208 cubic meters of CTPs in the production for the year. Therefore, the General Manager and his team performed a careful study on the CTP and found out the current CTP dimension can be reduced by 30mm to 720 x 576mm. After implementing this strategy the Printing Plant was able to generate 11% total material saving from the CTP in the year 2012. As Burritt *et al.* (2002) suggest this is the physical EMA information.

Introducing CTP baking machine

As a second strategy they introduced the CTP baking machine to the production. The reason was, at present the company has more than 70% of the market share in the newspaper industry. Due to this reason, ability to print large volume of printing copies from one CTP is highly important. Under the normal condition of CTP without baking it can print 100,000 to 125,000 newspaper copies only. After reaching this level the colors in the plate will begin to weaken and cannot be used

to print further. This number of copies was not enough to cater to the current demand of the company. In order to meet current market demand, company has to create another CTP of same print to continue the production and this caused high wastage of both material and time. After some studies carried out by the General Manager of the Plant together with his team, they discovered that one baked CTP can create 300,000 to 500,000 copies. Therefore, the Printing Plant introduced the CTP Baking Machine to their production to meet the current demand more effectively and efficiently with the consumption of less resource and energy. The company was able to gain 29% of gross saving from material before reducing the energy consumption of CTP Baking Machine, and the net saving of the material from the CTP Baking Machine after removing the energy cost was 28%.

Reducing the diameter of the reel butt

The General Manager and his team in the Printing Plant discovered another remarkable solution to reduce the white paper waste used in printing. Before finding this solution, the company removed the Reel Butt from the printing machine when it had a diameter of 140mm which was the global standard and this was sold at low price for salvage. After some studies carried out by one of the operations managers of the Plant, under supervision of the General Manager, he found that this global standard can be reduced up to 130mm with proper attention of the machine operator when the reel butt continued to print after the 140mm. Before implementing this strategy company made a loss of 30 to 35 copies of good news paper from each one of the paper reel used. After implementation of the solution together with some staff training and displaying visuals in factory premises, company was able to gain 35% of saving from the total material saving.

Introducing printing machines which have ink injectors

The printing plant earlier used ink spray guns in their printing process which caused high level of ink waste. Further, this caused damages to the nearby machines. As a solution, the company purchased new machines that have ink injectors which generated negligible ink waste throughout the printing process and this could be further adjusted by computer as for the printing requirement.

Apart from above mentioned strategies which have high technical expertise, the company had implemented few more low cost strategies to minimize the material wastage within the company.

Other strategies followed to reduce material wastage

The Management of the Printing Plant has instructed the operators to remove the damage paper from the paper reel manually without using the damage removal machine and limit it to the one or two rounds maximum from one reel. Management conducted training programs to introduce minor strategies to

improve the effectiveness and efficiency, such as training fork lift drivers to eliminate the damages caused to the paper reel during unloading from the container and refilling the container with newspapers. Further, visuals were being displayed in the factory premises to enhance awareness of the staff and also a competition was conducted between two shifts of the staff to make continuous improvement in efficiency in material usage. These strategies too resulted in a significant quantity of material savings with less technical and financial investments.

Water

Understanding the social responsibility and importance of saving water the printing plant has taken several actions to minimize the water wastage in the premises. Saving water from national water supply and tube well not merely saves water, but also helps reduce energy usage and the carbon footprint at a national level.

At present the printing facility has two major sources of water supply to fulfill the water requirements of human consumption and production requirement. These two sources are tube well and national water supply. Currently, 43% of the water requirement is taken from tube wells and the balance 57% is taken from the national water supply. The company uses this water for eighteen different activities. Before introducing CP practices the company did not have a clear idea about how much of water was consumed from the tube well and how much of water was consumed by the different activities in the factory.

To introduce CP strategies to water consumption, management had to identify the activities which consumed water and the amount of water that was consumed in each activity independently. To measure this, the management introduced a sub meter system to the factory and measured the water consumption of each activity separately. With the improved understanding of the water consumption, the company introduced some CP strategies such as introducing water control system for toilets and urinals, air conditioned condensing water reuse system, treated water reuse from waste water treatment plant and water saving project in rest rooms. By implementing these CP practices, the company was able to save 3% of the total saving of the year 2012.

Water control system introduced to toilets and urinals

Major contribution to the 3% reduction was rendered by the water control system introduced to toilets and urinals. Before introducing the new system, urinals had continuous water supply during the 24 hours in the entire year. The estimated water consumption in toilets urinals was 1,682 cubic meters per year. As a solution, the company installed a new system which releases one liter of water in

one manual flush. With the newly installed lavatory system, the company was able to reduce the water consumption in lavatories by 1,616 cubic meters for the year of 2012. The cost saving from this amounted to Rs.121, 217. It is clear that the organization is identifying the physical as well as monetary EMA (Burritt, *et al.*, 2002).

Air Condition condensing water reuse system

The company had also recognized another area where water can be saved, and that is drain water generation from the air conditioning (AC) machines installed in the premises. The management was able to quantify the amount of drain water flowing from all AC plants installed in the printing plant and this amounted to 60 liters per hour. The factory uses the AC machines 85 hours in a week on average, and this generates 265 cubic meters of waste water per year. Due to the magnitude of the waste water generated, the company installed a pipe line to collect this waste water from all AC plants in the premises to a tank and use this water in gardening, other washing and cleaning activities such as washing of vehicles, cleaning of bathrooms and lavatory areas.

Waste water treatment plant

In the printing process, the company uses water as an input with chemicals to maintain the PH level of water. At the end of the printing process, some amount of water will come out as contaminated water due to the chemicals used in the process. As per regulatory requirements, the company cannot release the polluted water generated from the production directly to the environment without reducing its PH value since company operates in a residential area. Therefore, as a solution the printing plant established a water treatment plant to purify the contaminated water of the printing process. With this plant, the company was able to purify 120 cubic meters of water, which is valued at Rs.88,800 in 2012. This water is reused in gardens, washing and cleaning activities.

Water saving project in rest rooms

The company had identified rest rooms as another potential place where CP can be implemented. Earlier, the rest rooms had showers with ball valves by which the operator could not regulate the water flow as per the requirement. As a result, the person who used the shower received a superfluous water flow. Due to the waste occurred from this outdated technology, the company had to endure an unnecessary cost. As a solution, the management replaced the ball valve with conceal valves where the operator can regulate the water outflow as per the requirement. This strategy enabled the company to save 127 cubic meters of water, which had a value of Rs.9,112 during the year of 2012.

5. Conclusion

This case study demonstrates how a newspaper printing company progressed towards becoming an environmentally friendly organization in a developing South Asian country where concerns towards environmental issues are still emerging. The developments achieved in terms of EMA adoption in this particular printing plant can be highly commended, for taking a proactive approach and setting the example for many other companies. However, it is not possible to claim that the company has achieved the status of a complete green company, as it has many more aspects to improve on. These actions include, but are not limited to; better planning of transport, maximizing the use of materials, shifting from 3R towards 7R (i.e., Reject, Reduce, Reuse, Reclaim, Repair, Replace, and Recycle), improving focus on energy management and green water harvesting.

The company has the opportunity to reduce the emissions to the environment by taking measures to print the first page of certain tabloid magazines in the printing plant itself, rather than printing in the other plant and transporting as currently practiced, which causes a great deal of transportation costs as well as air emissions. Further, the company still has scope towards utilizing material reel butts to a greater extent than the current usage where the printing is stopped when it gets to 130mm and hence the remaining material reel butt is sold as salvage at a lower cost. In addition, the company can implement the 7R concept, which means Reject, Reduce, Reuse, Reclaim, Repair, Replace and Recycle. With regards to energy management where electricity is greatly considered, it is recommended the company to move towards LED bulb usage during the night shifts and when the natural lighting is insufficient, as it could save more energy than the present use of CFL bulbs as well and generate more cost savings. This initiative will thereby enable the company to work towards achieving the energy management system standard, which is ISO 50001. In order to identify the environmental impact of its activities, the company can move towards calculating carbon foot print of its production. This will enable them to identify the amount of carbon emitted to the environment via its operations. The company could prioritize and select from the options above and implement these activities to be more cost effective together with being an environmentally friendly company. Although the company has ISO 14000 accreditation, it has still not gained any energy management standards, and through implementing some of the above recommendations the company could progress to obtain energy efficiency as well.

The study focused on a printing plant of a news paper printing company with some context specific features. Moreover, the most of these findings will be confined to news paper printing industry. More research is needed in the future to gain a better understanding of the EMA practices in the printing industry due to the diversity of the industry. These studies could cover different types of printing

operations, organizations of different scales, organizations that use different printing technologies, etc.

References

Bennett, M. and James, P. (1998), *The green bottom line: Current Practice and Future Trends in Environmental Management Accounting*, Greenleaf, Sheffield.

Bennett, M. and James, P. (2000), *The Green Bottom Line: Environmental Accounting for Management: Current Practice and Future Trends*, 2nd ed., Greenleaf Publishing, Sheffield.

Bouma, J. J. and Van deer Veen, M. V. D. (2002), "Wanted: a theory for Environmental Management Accounting", In Bennett, M., Bouma, J. J. and Wolters, T. (Ed.). *Environmental Management Accounting: Informational and Institutional Development*, Kluwer Academic, Dordrecht, pp. 279-90.

Burritt, R., Hahn, T. and Schaltegger, S. (2002), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review,* Vol. 12 No. 2, pp. 39–50.

Caractere. (1991), *Inks under the microscope*, Vol. 307 No. 23, pp. 50-2.

Gray, R. and Bebbington, J. (2000), "Environmental accounting, managerialism, and sustainability: is this planet safe in the hands of business and accounting?", In Freedman, M. and Jaggi, B. (Ed.). *Advances in Environmental Accounting & Management*, JAI Press, New York.

Hamm, V., Geller, A. and Gottsching, L. (1986). Heavy metals in wood, virgin pulps, waste paper and paper. *Papier*, Vol. 40, pp. 37–46.

Hopwood, A. G. (2009), Accounting and the environment, *Accounting, Organizations and Society*, Vol. 34 No. 3/4, pp. 433-9.

Linnenluecke, M. K. and Griffiths, A. (2010), Corporate sustainability and organizational culture, *Journal of World Business*, Vol. 45, pp. 357-66.

Mirvis, P. and Manga, J. (2010), "Integrating corporate citizenship: leading from the middle", In Smith, N. C., Bhattacharya, C. B., Vogel, D. and Levine, D. I. (Ed.*). Global Challenges in Responsible Business*, Cambridge University Press, Cambridge, pp. 78-106.

Schaltegger, S. and Wagner, M. (2006), *Managing the Business Case for Sustainability*, Greenleaf Publishing Limited, Sheffield.

Shafqat, A. (2011), The role of the municipality in waste water management in Bahawalpur city, *Management of Environmental Quality: An International Journal*, Vol. 22 No.3, pp. 282-291.

Simon, P. J., Giesson, B. C. and Copeland, T. R. (1997), Categorization of papers by trace metal content using atomic absorption spectrometric and pattern recognition techniques, *Analytical Chemistry*, Vol. 49 No. 14, pp. 2285-8.

Stoughton, A. M. and Ludema, J. (2012), The driving forces of sustainability, *Journal of Organizational Change Management*, Vol. 25 No. 4, pp. 501-517.

Tucker, P., Douglas, P., Durrant, A. and Hursthouse, A. S. (2000), Heavy metal content of newspapers: longitudinal trends, *Environmental Management and Health*, Vol. 11 No. 1, pp. 47-66.

Theodore, M. K, and Theodore, L. (2009), *Introduction to Environmental Management*, Taylor & Francis Group, New York.

Qian, W., Burritt, R. and Monroe, G. (2011), Environmental management accounting in local government: a case of waste management, *Accounting, Auditing & Accountability Journal*, Vol. 24 No. 1, pp.93 – 128.

World Commission on Environment and Development (1987), *Our Common Future*, Oxford: Oxford University Press.

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Solid Waste and Waste Water Management in the Hotel Sector: Empirical Evidence from a Sri Lankan Case

Alwis K U I*, Arachchige V K A S W K, Seneviratne P M, Thiruvalluvar G, Weerarathne H M S V

Abstract

Purpose – The purpose of this paper is to analyze the interplay between environmental management initiatives and environmental management accounting practices in the Sri Lankan hotel industry.

Design/methodology/approach – The study was based on the case study approach. The primary data were collected by conducting unstructured interviews and the facts gathered were fortified by direct observation. The secondary data were gathered through analyzing records such as *Green Directories,* technical diagrams on sustainability initiatives, records maintained on waste management and water consumption, online resources and various other articles. Several measures were undertaken to improve the reliability and validity. Explanation building approach was used to analyze the data gathered.

Findings – The hotel has emboldened itself to adopt and nurture environmental management initiatives through the sustainability philosophy permeated over the hotel chain. This philosophy has been stimulated by mutually interacting focal catalysts, such as cultivating a shared vision conflated with sustainability, training and awareness building, integrating stakeholders' interests and organizational learning. The initiatives have are further enhanced by the compatible environmental management accounting practices adopted by the Hotel.

Research limitations/implications –The findings of the study will be difficult to generalize due to the contextual factors associated with the research site, but will be more relevant to the hotel sector organizations with similar characteristics.

Originality/value - This report contributes to fieldwork research within the environmental accounting literature pertaining to the hotel industry in developing countries. The findings of the study can be constructively used as a guide to establish and sustain environmental management accounting practices in business organizations operating in the hospitality industry.

Keywords –Environmental management accounting (EMA); hotel industry; waste management; water management; Sri Lanka.

Paper type - Case Study.

* Corresponding Author: Email: umesha.alwis@yahoo.com

1. Introduction

Waste has become a growing concern in almost all industries around the world. Having realized the gravity of this issue, most companies worldwide are now concerned about taking necessary steps to minimize wastage. This is common to the hospitality industry as well. In the global context, the contribution of the travel and tourism sector represented 9% of GDP, 5% of investment and 5% of exports of the world economy (WTTC, 2012). Despite global impact of travel and tourism there is a scarcity of environmental management accounting (EMA) literature on the travel and tourism sector. Nevertheless, taking into account the impact on the environment, Environmental Management Systems (EMS) have recently been more recognized in the hotel industry (Chan, 2009). This is contrariwise to the finding by Wan (2007) that hoteliers generally did not value environmental management as an important tool (as cited in Waidyaseka and Nimanthi, 2007). Correspondingly, further according to Stipanuk (as cited in Chan, 2009) most of the hotels have implemented their in-house EMS in hotels with varying degrees of intensity in the past few decades.

In the Sri Lankan context, the hotel sector plays an important role. As a result of post war economic boom, the hotel sector in Sri Lanka developed rapidly (Central Bank, 2012). Identifying that tourism is one of the main industries that generate significant levels of waste in terms of waste water (also termed gray water) mainly arising from rooms, kitchen, pool area, laundry, restaurant and etc. and solid waste (mainly from restaurants and kitchen) and some hazardous waste (due the usage of certain chemicals along with air emission). Many large scale hotels in Sri Lanka have already implemented certain practices such as green teams, natural ventilation and LED bulbs that have helped to achieve significant savings related to waste treatment (Ratnayake and Miththapala, 2011). In this context, the purpose of this paper is to analyze the interplay between environmental management initiatives and environmental management accounting practices in the Sri Lankan hotel industry.

Although waste is clearly a noteworthy issue for hoteliers, examples of good waste management practices can be found across the hospitality industry. One such example became the base for this study. The hotel on which the study is based is situated in Negombo and is a Sri Lankan spa resort of distinctive elegance, designed by a renowned architect which adds to the value of being a proud member of luxury boutique hotels of the world.

The hotel follows waste treatment mechanisms, as encouraged by the increasing safety requirements of the industry, government regulations such as HACCP and ISO standards. Reflecting mimetic isomorphism as per DiMaggio and Powell (1983), the top management pressurizes the hotel to follow the competition

created by other luxury hotels which adopt these practices in order to ensure long term survival. The requirement has been compounded mainly due to the increasing awareness of the tourists who travel long distance to spend time without further increasing the carbon foot print. As per the Environment Protection Agency (EPA, 2010) hotels have numerous opportunities to prevent waste when purchasing supplies and food, serving customers and cleaning guest rooms. The hotel under study outshines its peers by exploiting all such opportunities.

The remainder of the paper is organized as follows. Section Two provides the literature review and Section Three focuses on the methodology employed. Section Four provides the findings of the study along with a discussion. Section Five, presents the conclusions.

2. Literature Review

Rikhardsson *et al*. (2005) pointed out in their study that literature on EMA is scarce. Despite prospects that EMA practices are varied, little has been done to explore that diversity. Thus, there is no single, universally accepted definition to the term (International Federation of Accountants (IFAC), 2005). However, as per IFAC (2005), EMA is broadly defined as the identification, collection, analysis and use of two types of information for internal decision making: Physical information on the use, flows and destinies of energy, water and materials (including wastes) and monetary information on environment-related costs, earnings and savings. More broadly, EMA analyses financial costs and benefits associated with the environment (Dorweiler and Yakhou, 2003) and non-financial information, to fulfil requirements of managers regarding corporate activities that affect the environment as well as environment related influences resting on the corporation (Burritt, 2004).

Both of the above definitions on EMA underline the concept of environment costs. One of the censures on conventional accounting is also that it largely pays no attention to the environment costs. Dorweiler and Yakhou (2003) remark in their studies that environment cost is cost on every environmental aspect, and cost of all types of related environmental actions. Burritt (2004) broadly explains in his studies that there is a range of considerations which environment costs depend on such as the management function, specific decisions made, the role of the manager in the value chain, the responsibility level of the manager and the performance appraisal system.

Considering the definition of EMA it is apparent that waste management is a part of EMA. As cited in Bates and Phillips (1998) in the UK waste is defined as (UK Environmental Protection Act 1990):

- Any substance which constitutes a scrap material or an effluent or other surplus substance arising from the application of any process; and
- Any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled, but does not include a substance which is explosive.

Managing waste substances is important in the hotel sector as well. As stated by Ratnayake and Miththapala (2011), after the end of the 30 year conflict situation tourism is becoming a very important sector in the Sri Lankan economic development contributing 7.9% to the GDP of Sri Lanka. Further, the tourism industry is one of the highest consumers of energy and natural resources and could become a cause of much environmental and social concern if proper conservation measures are not implemented. Similarly, Weerawansa *et al.* (2010) explain in their study that since tourists travelling to Sri Lanka come for diverse reasons, the hotels are located all around the country to appeal to their differing needs and in most cases these are located adjacent to environmentally sensitive places such as virgin forests, beaches and archeologically significant locations. Due to this, some time ago a number of protests and demonstrations also took place in certain places opposing this industry, expecting that there would be environmental damages. Therefore, proper environmental management practices are of paramount importance for hotels. Hence, consistent with Ratnayake and Miththapala's (2011) studies, Sri Lankan tourist hotel sector has a significant potential for improvement with regard to sustainable practices. Furthermore, prior studies show that sustainability practices in the hotel sector in Sri Lanka implicitly and explicitly lead to reduction in cost and improvement in profits (Weerawansa *et al.*, 2010).

Ratnayake and Miththapala (2011), Gunarathne and Lee (2013) and many scholars mention tangible gains and rewards of EMS such as operational cost savings, sound business practices, conformance to regulations and customers' requirements, increase access to capital, reduction in insurance premiums and increases in competiveness (Hughes; Haklik and Johnson as cited in Waidyaseka and Nimanthi, 2007). Ratnayake and Miththapala (2011) indicate that potential for waste management is very high, as the present waste management practices in the sector are at a very low level, except for a few special hotels. Their study show that sorting and selling the recyclable garbage would be beneficial to the hotel, even financially, as the cost of the small investment for purchasing of coloured bins is recovered within one or two years.

But as literature explains, the application of sustainability practices will also meet up with many challenges. Gunarathne and Lee (2013) imply in their study that the main challenge was to transform existing hotels into environment-friendly models and this is challenging in an already built-up place. Moreover, in order to reap the full benefits of environmental practices the support of various stakeholders is required and persuading these parties to provide such contribution on a regular basis is challenging. In addition, according to Gunarathne and Lee, successful implementation of EMA goes beyond the mere application or superiority of techniques. It requires the successful engagement of stakeholders on a regular basis to cover many environmental aspects comprehensively with a well-defined vision, that is, a *holistic* approach to its implementation. As indicated by Weerawansa *et al*. (2010) a main challenge in waste management for this industry is the difficulty to minimize waste generation or to educate the guests about it due to the nature of the industry and high competition in the sector. Therefore, best possible option remaining is to have proper waste management systems to run this industry in a sustainable manner.

3. Methodology

This section elaborates how the data was collected and analyzed in the study. The study was carried out using the case study approach (Yin, 2009) where the sustainability practices relating to solid waste and waste water management were studied in a real life context at a functioning tourist hotel in Sri Lanka. A main criticism regarding case studies is that the data collected cannot necessarily be generalized to the wider population and it is also very difficult to draw a definite cause and effect relationship from them. However, case studies allow a lot of detail to be collected that would not normally be easily obtained by other research designs.

Data gathering was done using direct observations and interviews as sources of primary data collection and archival studies as a source of secondary data collection. Usage of several methods as above when collecting data was instrumental to practice triangulation in this study which is one way of increasing the credibility in a study conducted (Cottrell and McKenzie, 2010).

Two visits were made to the hotel site which is situated approximately about 38 km from the Colombo city, in the suburbs of Negombo. The first visit was intended to give an initial understanding of the overall sustainability practices of the hotel in its day-to-day operations. Prior to the initial visit, a brief information search was carried out mainly by browsing the web site of the hotel and its hotel chain. The initial visit enabled the researchers to gather data for the study mainly through observing the hotel site and its operations. Visiting and observing the restaurants, lobbies, guest rooms, corridors, pathways, gardens, swimming pool, garbage

collection and compost generation facilities, water treatment facilities and biomass energy generation processes of the hotel enabled the researchers to get a clear picture of the waste and water management practices of the hotel. Since there were multiple observers (group members), the concern with the reliability of the observations made was minimized. The visit also provided the opportunity to obtain firsthand information from several persons involved in the sustainability initiatives of the hotel including the General Manager and the Environmentalist of the hotel.

Following the initial visit, further information search was carried out through the internet and other sources. This was done in preparation for the second visit to the hotel which was to be carried out with the intention of obtaining in-depth knowledge about the specific waste and water related sustainability initiatives along with their impact on management accounting aspects.

During the second visit, the data were mainly collected by conducting unstructured interviews with the hotel's Engineer and Environmentalist. These unstructured interviews with open ended questions facilitated to bring out authentic accounts of the interviewee's subjective experiences. Questions that emerged from the immediate context relating to the hotel's sustainability practices and accounting were raised to increase the salience and relevance of the questions (Klenke, 2008). These interviews also assisted to corroborate previously gathered data. Records relating to water usage and waste disposal were obtained from the hotel documentations for further analysis. Further, information and clarifications were requested and obtained through telephone and email conversations with the hotel's Engineer.

After collecting the required data from the above mentioned sources, the evidences were converged to assist in the analysis. In qualitative studies such as case studies, data analysis is conducted to transform raw data and obtain a meaning from it, without quantifying them (Monette, 2013). In this study, the case study data analysis technique of explanation building was used where cases are analyzed by building explanations of the case (Klenke, 2008; Yin, 2009). In analyzing and building the case, the existing sustainability practices relating especially to solid waste and water management activities and the physical and monetary recording and accounting activities were elaborated based on the understanding obtained from the data collected. The next section will provide the case study built revolving around the above aspects.

4. Findings and Discussion

This section provides the findings and discussion of the current practices and sustenance of solid waste and water management practices.

Current environmental and sustainability management practices

This section discusses the sustainability management practices already adopted by the Hotel and practices that are planned to be implemented in the near future. Most of these practices are in line with the sustainability practices implemented by other hotels of this group. Therefore it is evident 'Sustainability' is a common concept practiced across the entire chain of hotel. The discussion has been organized into two sections as solid waste management practices and waste water management practices.

Solid waste management practices

As per United Nations Environmental Programme (UNEP, 2003), in many destinations and regions dealing with solid wastes is becoming a pressing challenge as the amount of waste increases and the cost of dealing with this waste in a sustainable manner rise at an ever increasing rate. In most tourism facilities guest rooms, kitchens, restaurants, laundries, offices, gardens and conference rooms generate large volumes of solid waste which can result in negative ecological and aesthetic impacts. Therefore, it is essential for hotels to protect the environment by reducing the solid waste generation in order to satisfy the growing customer demand for environmental-friendly facilities. Numerous solid waste management practices being adopted by the hotel have been elaborated below according to the nature of solid waste described by UNEP (2003). These include hazardous waste, biodegradable and non-biodegradable waste and combustible and non-combustible waste.

Hazardous waste contains harmful chemicals and produces harmful by-products when burnt or placed in a landfill site (UNEP, 2003). One of the main areas that the hazardous waste could be generated at the hotel site is sludge produced from the waste water and sewage treatment plants. There is zero toxic waste from the waste water and sewage treatment sludge as the water used for the treatment plant contains no hazardous chemicals. Therefore, the hotel has the opportunity to dry out the sludge using drying beds. Then the dried out sludge is used as an organic fertilizer for coconut trees and gardens. In addition, LED bulbs are being used for lighting the entire hotel. LED lights contain absolutely no mercury or toxic chemicals, and conventional LEDs are made from a variety of inorganic semiconductor materials (Adams, 2007). The hotel does not use any externally purchased chemical fertilizers for gardening activities since only organic fertilizers produced within hotel premises are used. With the help of these practices the hotel maintains zero level hazardous waste-disposal throughout all operations.

According to Water and Waste Management Manual of UNEP (2003), biodegradable waste contains organic substances which can be broken down over time, treated and recycled into useful by-products such as biogas and compost while non-biodegradable waste consists textiles, chemicals, rubber and plastics which cannot be treated and recycled properly. The hotel has made a conscious decision not to use plastic water bottles within the restaurant and only glass water bottles provided by the water purification plant of the hotel group are offered for guests. Plastic water bottles carried by guests from outside are properly stored and given to the municipal council to dispose. The use of plastic has been reduced drastically by initiating several other practices such as dispensing shampoo in ceramic bottles, eliminating plastic cutlery, discouraging the use of plastic straws with cocktails or drinks, using wooden cocktail mixtures and reducing plastic in rooms. Also plastic and polythene shopping bags are not being used for hotel operations. A proper plastic crates handling system is used when delivering vegetables and other food items for kitchen by providing crates from hotel or using crates provided by suppliers to reduce the plastic waste. Also suppliers are informed continuously to reduce unnecessary packaging (e.g., milk powder packages) to strive for reduction of plastic and polythene consumption. More environmental-friendly materials such as wood curtains, cane baskets and clay tiles have been used for guest rooms. Also guests are encouraged to reuse linen and towels without daily removals through several ways such as displaying notices as only to put used towels near cloth bins if it is needed to change. Discarded towels and linens are used for cleaning purposes and if linens are in a reusable condition, those are donated for staff. The waste generated from the biomass boiler (ash of cinnamon wood) is mixed with fertilizer and used for plants.

The effective separation of solid waste has been initiated through separation of garbage and trash at their sources of origin in all departments of the hotel such as the kitchen, restaurant and bar, housekeeping and maintenance. The amount of waste generated at each source is measured at regular intervals to identify from where most of waste is being generated and whether it is beyond the accepted waste limit. Garbage is sorted properly and a color-coded garbage bin system is used to hold each type of garbage separately (wet garbage, polythene and plastics, glass, metal, paper and cardboard, etc.). Wet garbage collected during lunch (food waste) is sent to a nearby piggery that would support to reuse the wet garbage and as an initiative of a community development project. And all the other wet garbage collected during the daily operations and garden waste are being used to produce compost. A special compost machine is used by the hotel to produce compost using the collected food waste and that compost is used as an organic fertilizer for gardening and to maintain vegetable gardens of the hotel. The garden waste is also used to produce compost through traditional method as the daily input level of compost machine only process the food waste. The wet garbage which cannot be

separated or recycled is collected by the municipal council. Garbage is sent to municipal council only it cannot be reused or recycled at the hotel premises. In order to reduce the wrong garbage being collected by municipal council trucks, garbage to be sent out is sorted again by another employee after the first separation. Employees are trained continuously to separate the garbage properly in order to reduce the waste disposal because if misidentified, waste that could have otherwise been recycled can be disposed. Also daily food waste generated at staff cafeteria is measured and the information is disseminated among staff to make them knowledgeable about the daily amount of food waste produced by them and to construct a sense to reduce the waste.

Combustible waste such as paper, used oils, rubber and leather, has a high heat value, burns easily and releases heat energy when combusted. Non-combustible waste such as glass, aluminum and most organic waste (e.g., food scraps and garden trimmings) has a lower heat value and cannot be easily burned (UNEP, 2003). As elaborated in the previous section, as a practice, all recyclable organic waste is used for production of compost waste by the hotel. A separate store is used to collect all glass bottles and those will be sold later to generate an income. Paper usage is reduced by using software for management activities such as store maintenance. Stationery is reused and electronic mails are sent for inter-departmental activities to minimize the paper consumption.

Water conservation and waste water management

The hotel's corporate environmental policy, affiliated with the Green Directory Programme and JEEP (The hotel's Eternal Earth Programme), is focusing on encompassing improvements in the areas of water conservation and waste water management. Waste water is defined as, waste streams whose primary component is water but which also contain contaminants of some kind, such as high Biological Oxygen Demand (BOD), Total Suspended Solids (TSS), nutrients (such as phosphates), excess heat and toxic materials (IFAC, 2005).

In order to obtain the ultimate benefit of water, consumers should have to be savvy with efficient water use which is considered as a way to reduce the need for costly infrastructure with the assistance of efficiency enhancement options like metering, water reuse, water-saving appliances, landscaping, and public education (EPA, 2005). The major forms of waste water generated by a tourism facility are kitchen and restaurants, toilets and washrooms, housekeeping and maintenance, laundry and gardening (UNEP, 2003). In the Green Directory Programme of the hotel chain, it is identified that generally tourist hotels over use water resources for swimming pools, golf courses and personal use by tourists. Therefore, conservation of water has been identified as a vital area to be addressed in the corporate environmental policy.

With regards to the above mentioned understanding about efficient water use, the hotel has taken a number of initiatives to conserve water preceded by a systematic study conducted by an expert ecologist and those initiatives are addressed in this area of the case study report. The environmental and economic performance is evaluated through management accounting systems and practices that focus on both physical and monetary information (Bennett, *et al.,* 2008). As water saving appliances, the hotel is using cisterns with dual flushing facility which saves approximately 3 liters of water per one flush. Rain water shower heads are saving almost 20 liters of water per minute. Further the staff cafeterias are equipped with sensor faucets, which save a considerable amount of water compared to conventional manual taps. The hotel is focusing on obtaining contribution from guests in implementing water conservation initiatives by providing an option to reuse towels and linen without washing daily, which conserves water while cutting down the laundry cost. Currently, the hotel is not operating a laundry at the hotel premises and laundry tasks are accomplished using the laundry of another hotel of the same group located nearby. The operational staff is provided training regarding water conservation practices such as, reducing water consumption in washing dishes during the orientation program and monthly training programs. The house keeping staff and technicians are responsible for preventive maintenance of interior water drainage system. Water consumption in different departments like kitchen, guest rooms, restaurants and public area are monitored by installing separate meters, which helps to identify the departmental patterns of water consumption and make decisions accordingly. Guests are provided in-house purified drinking water, which is refined at the self-sustaining mobile water purification and bottling plant (Reverse Osmosis (RO) plant) of the hotel group. This initiative has been identified as a cost effective and quality alternative compared to external purchasing. Moreover the prodigious swimming pool of the hotel is recognized as a unique feature of the hotel. The swimming pool pump room, which purifies pool water using sodium chloride provides an extra comfort to the guests along with eco-friendly cost savings approximately LKR 30 per 1kg of sodium chloride. In addition, the recycled water in the water treatment plant is used for cooling towers, toilet flushing and gardening purposes. As a continuous monitoring initiative, the hotel is carrying out monthly green audits where water consumption is a vigilant criterion (EU-Switch Asia, 2013).

When considering about the management of waste water in the hotel, the Water Treatment Plant (WTP) located in the facility purifies sludge and consumes grey water through a technical process (Appendix 01). The plant purifies around 7000 liters of waste water per month. Technicians are appointed for the continuous monitoring of the process and once every six months, a third party checks the quality of water to ensure it meets the required standards of the Central

Environmental Authority. The precipitation of the process is sent to Sludge drying beds, which produce fertilizer for gardening purposes. Even though, the same RO purification process can be applied to refine water obtained from the nearby lagoon, the hotel does not adopt the option due to less cost benefit advantages; i.e. this process incurs additional LKR 75 for each 1000 liters of water comparing to the water obtained from water board which costs LKR 75 per 1000 liters. The next section explains how these practices are sustained.

Sustenance/continuous improvement of EMA practices

Effectiveness and the continuous improvement of the EMA practices in the hotel are stimulated by mutually interacting focal catalysts, such as cultivating a shared vision conflated with sustainability, covering an extensive array of sustainability aspects, training and awareness building, integrating stakeholders' interests, and organizational learning. The sustainable vision inspired by the top management's clear advertence on sustainability plays a main role in continuously improving EMA practices. JEEP and the green directory to be implemented are managing numerous sustainability aspects such as energy, water and waste management, pollution prevention and corporate social responsibility. Training and awareness building has allowed the hotel to provide employees the appropriate initial and ongoing training, which enhances their active participation and involvement in the tasks related to EMA practices.

By integrating stakeholders' interests, the hotel has established trust-based collaborative relationships with a wide variety of stakeholders, which facilitates an open dialogue to share information, identify and prioritize stakeholders' environmental concerns and share gains obtained from environmental initiatives. Also organizational learning promotes changes to internal values, routines, and rules that represent collective learning. Currently the Hotel is in the process of obtaining HACCP, ISO 14001 and ISO 50001 standards. 68% of the tasks of Green Directory are completed and 15% of the remainder is already scheduled. In the process of continuous improvement, the hotel has earned justifiable recognition from the world over namely, Pacific Asia Travel Association (PATA) Grand Award 2013, Trip Advisor Travelers' Choice Award. Further, initial audits have been conducted to award the Travel Life Gold Award.

Physical and monetary accounting practices

This section discusses benefits obtained by the hotel through waste management practices in terms of environmental accounting aspects. Environmental Management Accounting (EMA) is broadly defined to be the identification, collection, analysis and use of two types of information for internal decision making; physical information on the use, flows and destinies of energy, water and materials and monetary information on environment-related costs, earnings and

savings (IFAC, 2005). In this respect, the hotel has a well-structured EMA process which includes planning, data collection, accounting for environmental information, analyzing and strategy development with an ongoing monitoring strengthened by continuous staff training and customer awareness. If the waste reduction plans are not feasible and advantageous business wise, penetration towards sustainability practices will get diminished. Therefore, the benefit of solid waste and waste water management practices of the hotel has been translated into physical and monetary units as follows.

Solid waste management

Through the several solid waste treatment and management projects, currently more than 80% of the waste generated by all departments of the hotel is being recycled. As explained in the previous section, since the solid waste is sorted into several types such as cardboard, used papers, glass bottles, polythene, and burnt oil, measurement of physical units of waste has become a clear and transparent task. Even though the hotel has started its operation very recently (from April 2012), incorporation of environmental accounting has also been initiated after few months of inception. The sorted waste sold for recycling has been calculated since July 2012. From July 2012 to August 2013, the largest portion of (nearly 43%) this sold waste consists of glass bottles and 3643 bottles has been sold during this period. As Appendix 02 depicts, in each month on average, 115 kg of cardboard, 260 glass bottles, 45 liters of burnt oil, and 64 kg of tins have been sold for recycling during the past 14 months. By selling this waste for recycle, the hotel has earned a total of Rs.105,560 during those 14 months and averagely it's Rs.7,540 per month and this income is used as a contribution for employee welfare society to motivate the staff towards sustainability practices.

Table 01-Annual compost production

Year	Month	Weight of Waste (kg)	Weight of produced compost (kg)	Compost amount as a % of waste
2012	July	786	121	15
	August	1,220	180	15
	September	820	70	9
	October	0	0	0
	November	835	180	22
	December	1,130	200	18
	Total	**4,791**	**751**	**16**
2013	January	1,230	280	23
	February	843	95	11
	March	887	110	12
	April	450	105	23
	May	1,010	255	25
	June	975	105	11
	July	940	120	13
	Total	**6,335**	**1,070**	**17**
TOTAL (2012+2013)		**11,126***	**1,821**	**16**

*11,126 kg of wet garbage was re-cycled and transformed into 1821kg of compost fertilizer.
Source: Engineer's data

Each day 50 kg of wet garbage is used as the input for the compost machine used by the hotel. Even though the normal duration needed for compost generation is 40 days, this machine has reduced the compost process cycle up to 14 days. During 2012, 4791 kg of wet garbage was recycled and transformed into 751 kg of compost fertilizer. And 6335 kg of wet garbage was transformed into 1070 kg of compost fertilizer in 2013 (from January to July). On average 16% -17% of wet garbage is converted into compost using this machine annually (Table 01).

Seasonal effects on solid waste generation can also be tracked through the physical measurement of solid waste. If monthly sorted waste sold for recycling and wet garbage used for compost production is referred, it is evident that the amount of waste has increased in peak months like August, December, and January. But it is clearly visible that the hotel has been able to reduce some of the waste even in peak demand times, as 73 kg of waste cardboard sent for recycling has been

reduced in August 2013 when compared with August 2012. Also roughly 30% of the annual linen used is discarded during one year. And by considering these physical and monetary measurements, green audits are carried out by the hotel during each month.

Waste water management

A commitment to water reduction begins at the top, ensuring that the management team fully supports this project (Kuoni, 2012). The hotel's top management, housekeeping, maintenance, grounds keeping, kitchen, engineering and accounting departments are collectively involved in all the planning stages of EMA practices in the hotel preceded by a prior analysis conducted by an expert ecologist. Certain individuals have been identified for key roles as detailed in Table 02.

Data regarding water conservation and waste water management in the hotel is collected and analyzed in terms of both physical and monetary terms, where physical data is given much dexterous focus comparing to the monetary data. The tracking of physical information on the flow of energy, water, materials and wastes is important under EMA, because such information allows an organization to assess and report the important materials-related aspects of its environmental performance (IFAC, 2005).

Table 02 -Key roles of senior officers in the hotel

Designation	Role	Experience required
Managing Director	Understand program objectives, Define timings and expected results	Motivate staff and approve changes/spending
Hotel Manager	Co-ordinate collection of data, Plan necessary training	Attention to detail with data received, analytical thinking to formulate action plan
Technical / Maintenance Manager or Engineer	Data collection, Placement of meters, Physical measurements, etc.	Good numeracy, ability to complete worksheets and cost-benefit calculations
Accountants	Budget spending on water saving devices, Reporting, data analyzing, monitoring, investment appraisal	Budget planning, Cost benefit analyzing, Investment decision making, Controlling
Head of housekeeping	Data collection, target setting, monitoring	Keen supervision
Head of kitchen	Data collection, target setting, monitoring	Keen supervision
Head of grounds	Keeping data collection, target setting, monitoring	Keen supervision

Source: Author Constructed

In the hotel, physical data is collected in both absolute and relative terms. In relation to the absolute indicators, overall average water consumption is measured on daily and monthly basis. Water consumption per day is averaged to 60 cubic meters which leads to 1800 cubic meters consumption per month. Further, the hotel is measuring the departmental water consumption by installing separate water meters for Guest rooms, Kitchen, Boiler, Chiller, Staff accommodation and GM quarters, Cistern, Garden and Waste water treatment plant.

Moreover, the relationship between water consumption and room occupancy is calculated on monthly basis as a relative indicator which depicts the positive relationship between the two variables. Another revelation of this analysis is, after the operations of the Waste water treatment plant has actively commenced in June 2013, water consumption per occupied room has been decreased to 1.76 cubic meters (Table 03).

Table 03-Water Consumption per occupied room (First two quarters, 2013)

Month	Total water consumption (m^3)	Occupied rooms	Water consumption per OR(m^3)
January	1648.4	663	2.49
February	1968.7	1049	1.88
March	1817.5	909	2.00
April	1555	663	2.35
May	1480.8	707	2.09
June	1262.27	717	1.76

Source: Engineer's data

In addition to that, Table 04 explicates the savings generated from the newly installed waste water treatment plant in the hotel. The departmental consumption readings reveal that the new plant has been able to cut down 81 percent and 27 percent of water consumption of the Chiller and Guest rooms respectively. The waste water treatment plant recycled 355.4 cubic meters of water for the month of June 2013.

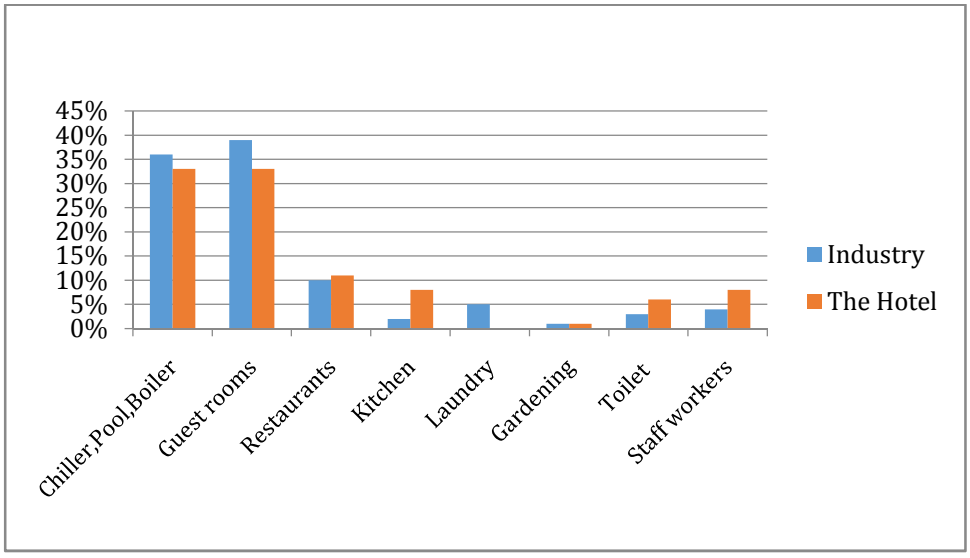
Table 04 - Savings from the waste water treatment plant

Department	January (m3)	June (m3)	Saving (m3)	Saving (%)
Guest rooms	582.4	422.9	159.5	27%
Kitchen	137.3	100.2	37.1	27%
Boiler & HW	356.3	367.7	-11.4	-3%
Chiller	273.5	50.9	222.6	81%
Staff acc., GM quarters	211.9	237.2	-25.3	-12%
Cistern	87	76.4	10.6	12%
Garden	N/A	6.97	-	-
Total	1648.4	1262.27	393.1	

Note: Savings are computed comparing the January 2013 (before installation of the plant) and June 2013 (after active operations of the plant has begun) months.
Source: Engineer's data

As an advanced phase of EMA practices, the hotel compares its own departmental water consumption with departmental water consumption of the hotel industry (Figure 01). This benchmarking divulges that the hotel's water consumption is well below the industry average consumption in Guest rooms and the Chiller categories.

Figure 01 –Comparison of water consumption



Source: Authors Constructed based on Engineer's data

When considering the monetary aspect of EMA practices, similar to the physical information collected under EMA, monetary data can be collected for an organization as a whole, or for particular sites, input materials, waste streams, process or equipment lines, product or service lines, depending on the intended use of the information (IFAC, 2005). In the Hotel monetary terms of water related EMA information is used for calculation of costs, savings generated from water management initiatives as well as to perform Cost benefit Analysis (CBA). The average cost of water consumption per month of the hotel is Rs.250,000, where cost per one cubic meter of water derives as Rs.138.88. After installation of separate meters for departments, the hotel can compute the cost of water consumed by each individual department, where Boiler, Chiller, Guest rooms, and Restaurants can be recognized as highest cost consuming departments pertaining to water consumption.

In relation to the monetary savings generated from water management initiatives, the hotel has identified there is a substantial saving of water cost from the installation of Waste water treatment plant in June 2013, which amounts to Rs. 54,594. The value of waste water treated during the month of June is Rs.49,358. Further, by substituting Sodium Chloride for swimming pool water purification process instead of Chlorine a saving of Rs.73,920 has been identified.

The hotel is considering the related costs and potential benefits, which are raised by implementing environmental friendly initiatives at all possible events where the implementation of the initiative is not mandatory. After conducting such a Cost benefit Analysis (CBA) for purifying water fetched from the nearby lagoon it has been noticed, that the hotel can purchase similar purified water from the Water Board at Rs.75 (per 1000 liters), where the purification process costs Rs.150 (per 1000 liters). Therefore, the hotel has abandoned the proposal.

Monitoring is an essential component of any plan, be it managing water, solid waste or energy (Kuoni, 2012). In the hotel the ongoing monitoring process for water consumption is enabling the engineers and technicians to identify fluctuations in consumption occurred due to seasonal (for example, increased irrigation demand in the dry season) and occupancy factors, as well as savings from water management initiatives. In addition to that, breakdowns and leakages can be figured out by tracking abnormal patterns in water consumption. The EMA practices of the hotel are reinforced by the monthly management briefings and employee training sessions. Further, the awareness of guests regarding EMA practices, which are carried out by the hotel is enhancing the smooth flow of the process.

5. Conclusions

As demonstrated by previous chapters, the hotel has used numerous solid waste and waste water management practices. Environmental accounting information (physical and monetary units) depicts how the effectiveness of those projects is gradually enhancing with time, several advanced technological implementation and well-planned training programs. The proper attention paid by the hotel on continuous improvement of waste reduction projects has also contributed significantly for effective execution of waste management practices. Certain improvements can be recognized even in the middle of the adoption of comprehensive waste reduction and recycle programs.

The hotel can incorporate cost savings derived from organic fertilizer. Since the hotel uses only organic fertilizer for gardening there is an economic advantage in physical and monetary terms as a result of non-consumption of outside fertilizers. If the saving obtained by eliminating purchased fertilizer is calculated monthly and annually, it can also be considered as a contribution to improve the current accounting figures associated with waste management projects. Even though some of the hotels in this group have already started the production of bio gas, this hotel has not yet planned to initiate the production of bio gas by improving their Sewage Treatment Plant (STP). Bio gas provides a non-polluting and renewable source of energy and produces enriched organic manure, which can supplement or even replace chemical fertilizers. Also it leads to improvement in the environment, sanitation and hygiene. Therefore, the financial benefit that will flow to the hotel with the use of bio gas would facilitate to enhance the economic advantage of being an environmental-friendly tourist destination.

Also the hotel should focus more on separating trash at source. Currently, cloth bags with several pockets to store different types of garbage are being used in guest rooms to encourage visitors to identify each type of garbage and properly separate them for efficient disposal. This system can further be improved by displaying notices in each room requesting guests to use separate waste paper baskets provided in order to separate trash into degradable and non-degradable trash. And the installation of advanced equipment to enhance the performance can be considered. The existing water saving appliances can be further strengthened by installing equipment with enhanced performance such as water-saving faucet devices with infrared and ultrasonic sensors, pressure-reducing valves in Guest rooms, liquid pool covers which retain heat and prevents evaporation of swimming pools, pre-rinse spray valves, combination ovens, steam kettles, clean up equipment and steam cookers in the kitchen. Rainwater harvesting techniques can be used to consume rainwater, which is currently captured from roofs and gutters. Water can be diverted into underground storage tanks or into water butts and used for gardening purposes later on.

A laundry can be established in the hotel premises with energy efficient machinery, commercial water softeners along with a proper laundry wastewater recovery and recycling system. The guests can be awarded for the changes made in their behavior like reusing linen and reducing water consumption by donating the savings to charity or offering vouchers to spend at the hotel. Guest's feedback on other potential water saving measures can be obtained by conducting standard guest satisfaction surveys. Also the hotel can extend the existing system boundaries beyond their own operations to include physical information from suppliers such as the Ceylon Water Board, guests and other elements of the supply chain, with Supply Chain Environmental Management in mind. Since currently the hotel is not calculating separate water foot print, initiatives can be taken to calculate it and as a subsequent phase the dining menu can be revised by providing low water foot print food alternatives. Furthermore, the hotel can adopt the EMA reporting formats with a global recognition such as Global Reporting Initiatives (GRI), Carbon Disclosure Project and Carbon Trust Water standard which will promote the name of the hotel to the worldwide tourism community.

A main limitation of the study would be the difficulty in generalizing its findings of. The study has been done on a qualitative approach in which case the findings are generally not possible to apply to the overall scenarios due to the differences in the contexts. Additionally, even though steps were taken to improve the quality of the data collected by using several methods, there is still the possibility that some biasness occurred in the study. This is because there was a high level of reliance on the data obtained from the hotel and its staff, who are generally inclined towards promoting the hotel and its activities.

Further, researches can be carried out related to whether there are similarities in the EMA practices in the hotel industry in Sri Lanka and if there are differences what the reasons are for that; does the hotel size impact on the sustainability initiatives followed; are the efforts towards sustainability recognized in the Sri Lankan context; and are accountants playing a relatively lesser role in the organizational efforts towards reporting on sustainability. Increasing the research conducted on sustainability and sustainability accounting would help to increase the awareness on these aspects and would ultimately lead to a positive impact on the general wellbeing of the society at large.

References

Adams, M. (2007), Mercury Contamination Alert Why LED Light Bulbs safer than Compact Fluorescent, retrieved on 27.08.2013, via http://www.organicconsumers.org/ articles/article 5736.cfm.

Bates, M. and Phillips, P. (1998), Waste minimisation in food and drink industry, *Nutrition & Food Science*, Vol. 6, pp. 330-334.

Burritt, R. L. (2004), Environmental management accounting: Roadblocks on the way to the green and pleasant land, *Business Strategy and the Environment*, Vol. 13, pp.13-32.

Burritt, R. L., Bennett, M. J., Jasch, C. and Schaltegger, S. (2008), *Environmental Management Accounting for Cleaner Production,* Springer, Dordrecht.

Chan, W. W. and Ho, K. (2006), 'Hotels' environmental management systems (ISO 14001): creative financing strategy, *International Journal of Contemporary Hospitality Management ,* Vol. 18 No. 4, pp. 302-316.

Chan, W. W. (2009), Environmental measures for hotels' environmental management systems ISO 14001, *International Journal of Contemporary Hospitality Management*, Vol. 21 No. 5, pp. 542-560.

Cottrell, R. and McKenzie, J. F. (2010), *Health Promotion & Education Research Methods*, Jones & Bartlett Publishers, Burlington, Massachusetts.

Eco Village. (2012), Advantages and Disadvantages of Bio Gas, retrieved on 28.08.2013 via http://www.ecovillage.org.in/ecopedia/alternate-energy/advantages-and-disadvantages-of-biogas.

Environmental Protection Agency (EPA). (1995), *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA, Washington.

Environmental Protection Agency (EPA). (2000), *Waste Reduction Tips for the Hotels and Casinos in Indian Country,* EPA, Washington.

Environmental Protection Agency (EPA) (2005), *Case Studies of Sustainable Water and Wastewater Pricing*, EPA, Washington.

EU Switch Asia Programme. (2013), Green Practices of Sri Lankan Hotels, Ceylon Chamber of Commerce, retrieved on 27.08.2013, via http://www.greeningsrilankahotels.org/userfiles/Research_Report_Final_2_.pdf.

Gunarathne, N. and Lee, K. (2013), Adopting and Implementing Environmental Management Accounting (EMA) Practices in the Hotel Sector: A Sri Lankan Case, A paper presented at the EMAN Global Conference, Gold Coast, Queensland.

International Federation of Accountants (IFAC), (2005), *International Guidance Document: Environmental Management Accounting,* IFAC, New York, NY.

Klenke, K. (2008), *Qualitative research in the study of leadership,* Amsterdam, Netherland: Elsevier Science.

Kuoni Water Management Manual for Hotels. (2012), retrieved on 22.08.2013, via https://www.google.lk/#psj=1&q=http:%2F%2Fwww.kuoni.com%2Fdocs%2Fkuoni_wmp_manual_0.pdf.

Monette, D. R., Sullivan, T. J. and Dejong, C. R. (2013), *Applied Social Research: A Tool for the Human Services*, Connecticut, Cengage Learning, UK.

Potts, T., Christenbury, J. and Wolak, F. (2000), *Recycling for the Hospitality Industry, Cooparative Extension Service,* Clemenson University, South Carolina, USA.

Ratnayake, N. and Miththapala, S. (2011*), Study on sustainability consumption practices in Sri Lanka Hotel Sector*, Moratuwa: Department of Civil Engineering – University of Moratuwa.

Repak. (2011), Waste management for the hospitality industry-prevent and save, retrieved on 26.08.2013, via https://www. Preventandsave.ie/…/waste%20management.

Rikhardsson, P., M., Bennett, M., Bouma, J. J. and Schaltegger, S. (2005), "Environmental Management Accounting: Innovation or Managerial Fad?", In Rikhardsson, P. M., Bennett, M., Bouma, J. J. and Schaltegger, S. (Ed.). *Implementing Environmental Management Accounting: Status and Challenges,* Springer, Netherlands, pp. 1-16.

Tuppen, H. (2013), Water Management and Responsibility in Hotels, retrieved on 28.08.2013, via http://www.greenhotelier.org/know-how-guides/water-management-and-responsibility-in-hotels/.

United Nations Environmental Programme (UNEP). 2003, *A Manual for Water and Waste Management: What the Tourism Industry can do to Improve Its Performance*, United Nations Publications, New York, NY.

Waidyaseka, K. G. A. S. and Nimanthi, G. W. H. (2007), *The Impact of ISO 14001 Certification on Performance of Hotel Sector in Sri Lanka*, University of Moratuwa, Sri Lanka.

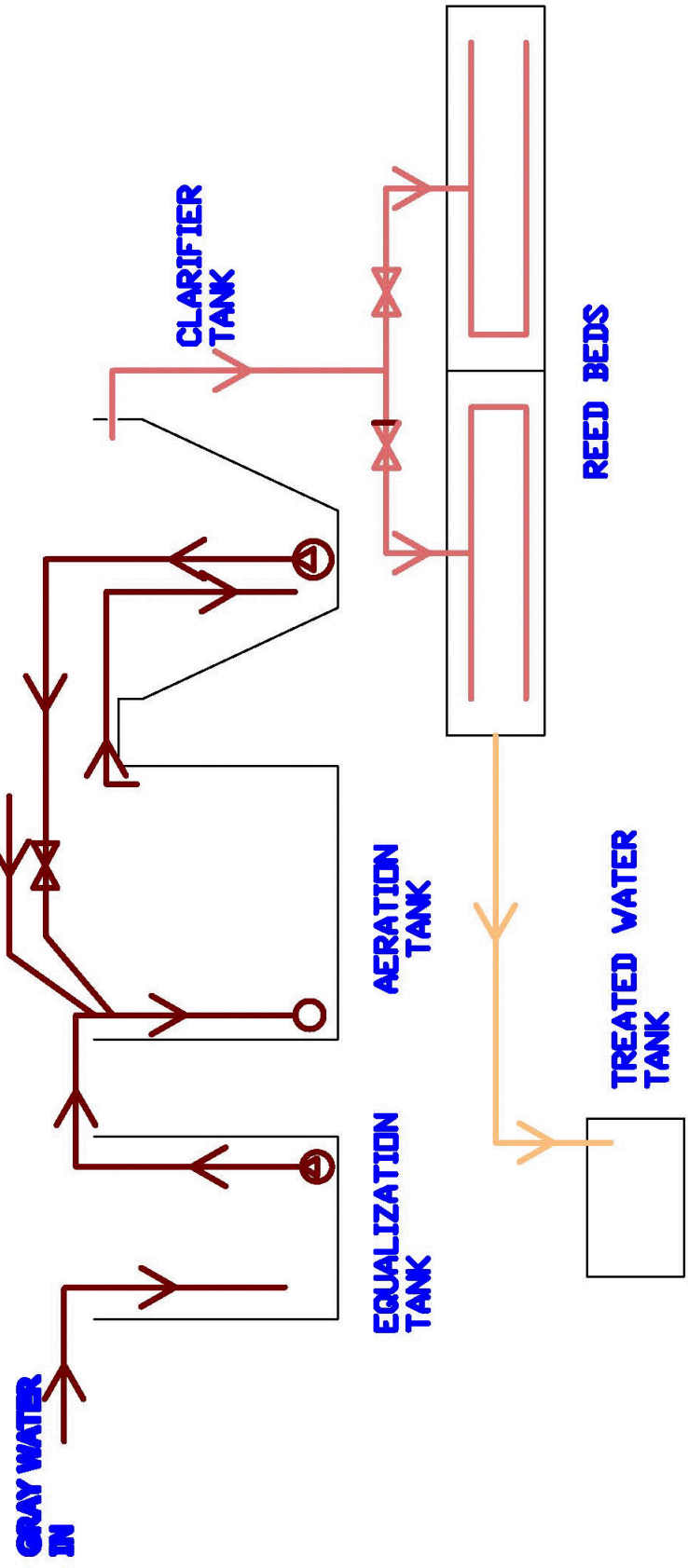
Weerawansa, A. M. G. E., Kulatunga, A. K. and Dissanayake, M. T. R. (2010), *Total Waste Management Using Cleaner Production and Industrial Ecology Principles in Sri Lankan Hotel Sector,* Department of Production Engineering, University of Peradeniya.

World Travel and Tourism Council (WTTC). (2012), *Economic Impact of Travel & Tourism 2012*, WTTC, London.

Yakhou, M. and Dorweiler, V. P. (2004), Environmental accounting: an essential component of business strategy, *Business Strategy and the Environment,* Vol. 13 No. 2, pp.65-77.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

Appendix 01: Waste Water Treatment Plant



Appendix 02: Sorted waste sold for recycling

Item	Unit	12-Jul	12-Aug	12-Sep	12-Oct	12-Nov	12 Dec & 13 Jan	13-Feb	13-Mar	13 Apr & May	13-Jun	13-Jul	13-Aug	Total	Average
Cardboard	Kg	110	227	132	146	118	240	59	100	120	135	75	154	**1,615**	**115**
Used Papers	Kg	59	38	30	13	47	56	25	45	57	93	43	74	**579**	**41**
Glass Bottle	nos	128	211	190	240	201	600	210	330	373	240	330	590	**3,643**	**260**
Burnt Oil	Liter	-	45	50	45	35	100	60	60	60	80	60	40	**635**	**45**
PET bottle	Kg	27	57	37	49	29	56	6	24	47	17	33	41	**422**	**30**
Polythene	Kg	3	-	-	-	-	21	-	-	-	-	7	-	**31**	**2**
Aluminum cans	Kg	2	9	1	-	-	15	-	-	-	-	3	-	**30**	**2**
Tin	Kg	28	11	5	5	6	98	65	120	129	143	100	180	**889**	**64**
Scrap metal	Kg	36	-	-	-	-	-	-	-	-	-	-	-	**36**	**3**
4lt Plastic cans	nos	3	13	11	15	8	31	17	16	27	36	41	72	**290**	**21**
5lt Plastic cans	nos	7	23	4	7	5	17	25	14	28	35	24	52	**241**	**17**
10lt Plastic cans	nos	-	-	-	-	-	3	8	-	-	-	-	-	**11**	**1**
20lt Plastic cans	nos	4	9	1	6	4	10	10	5	6	7	9	9	**80**	**6**
Income		**10,485**	**7,818**	**7,514**	**9,084**	**5,033**	**13,309**	**6,288**	**7,006**	**9,468**	**11,015**	**8,571**	**9,969**	**105,560**	**7,540**

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Environmental Management Accounting in a Manufacturing Arm of a Financial Services Sector Organization: A Case of a Sri Lankan Organization

Edirisooriya K K*, Noopehewa P U, Perera S A D C U, Silva M N I

Abstract

Purpose - The purpose of this paper is to examine why and to what extent a manufacturing arm of a financial sector organization in Sri Lanka adopts and implements environmental Management Accounting practices.

Design/methodology/approach - The study followed a case study approach. The primary data were collected by conducting semi structured interviews and observing organizational processes. Secondary data were collected through analyzing documents such as internal records, online sources including the organization's web site and various other records. In the data collection process higher emphasis was placed on data triangulation. Data analysis was carried out following an explanation building approach.

Findings - The study identified that although the waste management initiatives are practiced to a great extent, they do not encompass a comprehensive and an integrated approach. The intention for cost savings and the significance of the output being generated are the main drivers for adopting environmental management accounting practices. Top management awareness remains poor and an integrated strategic approach for sustainability management is not well established within the organization.

Research limitations/implications - Due to the context specific characteristics, the findings of the study will be difficult to generalize. Also, the study mainly emphasized on the process of collecting and re-using gold dust, but other critical areas such as waste water and air pollution was not investigated.

Originality/value - The study attempts to fill the gap of environmental management accounting research in a manufacturing operation of financial sector of a developing country. The findings of the study will be expedient to the sector in developing and retaining environmental management accounting practices.

Key words – Developing country; environmental management accounting; financial service sector; waste management initiatives.

Paper type - Case Study

* Corresponding Author: E-mail: kawimgt89@gmail.com

1. Introduction

Sustainability is a vital phenomenon in today's world since all human choices and actions will affect the future of the planet. Although, the earth provides for the needs of the living, if the environment is not taken proper care of, it will be damaged, and may even lead to extinction of all the living beings. Hence, it is vital to reduce the harmful impact of human activities on the environment and reduce the consumption of natural resources (Erdas, 2011). To this end, managing scarce resources and minimizing wastage is extremely important within the modern corporate world and businesses are continuously looking for measures and techniques to meet sustainability challenges.

There is an increasing pressure from stakeholders not only on managing scarce resources but also about the impact of corporate activities on the environment. The costs of environmental impacts have led to the emergence of various perceptions and practices of environmental accounting (Burritt *et al.*, 2002). Despite the importance of environmental accounting for any business organization, there is a dearth of research pertaining to the financial industry. Therefore, an organization operating in the financial industry of Sri Lanka has been selected to analyze how sustainable business practices are being applied. An efficient financial sector is essential to a well-functioning economy whereby it should serve in improving the efficiency of the economy as well as increasing its productivity (Pisano *et al.*, 2012). Even though sustainability is among the key words within the current context, the financial services sector hasn't been doing a very good job in these realms as they lurch from one major financial crisis to another (Eccles and Serafeim, 2013). We believe the findings of this study will contribute to fill the lacuna of research in this less researched industry of a developing country.

Stakeholders do not think environmental issues are irrelevant to financial institutions. They think that sustainability initiatives, especially environmentally responsible practices, can greatly benefit the institution itself more than the better public image generated (Eccles and Serafeim, 2013). Therefore, amidst the highly volatile business environment, the necessity for implementing environmental friendly initiatives and proper waste management strategies within the organizations operating in the services sector, especially the financial services sector is becoming vital.

The selected organisation is a leading finance company registered under the Monetary Board of the Central Bank of Sri Lanka. Its product range includes fixed deposits, pawning, gold sales, leasing, hire purchase and property development. Among them, pawning and gold sales are two important products of the company. Sale of gold is being focused and is under the spotlight in this research. The company provides pawning advances on gold articles with a total settlemet period

of 13 months from advanced date. As a general practice, all customers do not redeem their jewelry and ownership of those articles ultimately transfers to the company. Since gold is a valuable material and every mili gram of gold has a significant value addition to the organisation, the company uses the unredeemed jewelry to prepare gold bars or sell in their show rooms. If a customer does not redeem the articles, the items are being transferred to the gold division through a stock transfer. Normally 90% of pawned articles are redeemed by customers and only 10% are transferred by pawning division to gold division as unredeemed articles.

The rest of the paper is organized as follows. Section Two presents the literature review of the study which is then followed by the research methodology in Section Three. Section Four provides the findings and discussion. The last section provides the conclusions.

2. Literature Review

The term "sustainability" is among the most important themes that emerged at the global level in the last few decades. According to World Commission on Environment and Development (1987), in a report accepted by many as one of the first global reports to address sustainability, sustainable development has been defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Serious efforts are currently in place by growing number of companies worldwide to incorporate sustainability into their business practices. But most organizations face the problem of sustainability being alienated from the business strategies and performance evaluation which is frequently liberated by purely economic indicators (Petrini and Pozzebon, 2010). Since the interconnected world today is overwhelmed with environmental, social, economic and ethical issues, Avery (2010) states that organizational performances can be enhanced through a system of sustainable practices. Organizations are increasingly tending to integrate expectations of the society to their business practices to provide better response to the rising pressure from stakeholders while exploring prospects to build competitive advantage (Petrini and Pozzebon, 2010).

However, there is a notable absence of sustainable development literature on the services sector despite its global impact. It is little known how and to what extent service organizations adopt and/or implement sustainability practices especially in developing countries particularly in relation to waste management practices (Gunarathne and Lee, 2013). Managing waste is one of the most challenging for industrial, commercial and institutional sector since organizations are dealing with various types and large amounts of waste. So an integrated waste planning

approach is needed to define solid solutions and to create comprehensive strategy which is capable of supporting the organization in light of changing economic, social, material and environmental conditions (Davidson, 2011). Thus there is a need to demonstrate how environmental/sustainability management accounting practices are applied by organizations especially in the services sector. The next section provides the methodology applied in the study for this purpose.

3. Methodology

Yin (2009), states that a case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between the phenomenon and context are not clearly evident. Case studies have emerged as an increasingly important qualitative approach in many management disciplines (Gummesson, 2000; Scapens, 2004). It is advantageous to use case study methodology to analyze sustainable practices of the company as it studies the given context in detail. The case study method was identified as appropriate due to nature of research question, lack of control over events and focus on the contemporary real life phenomenon in the study (Yin, 2009). Marginson (2004), states that the ability to collect data from multiple sources is a major strength of a case study.

In order to collect data the company premises was visited and data were collected from primary and secondary sources. The primary data were collected by conducting semi structured interviews with the General Manager. The first interview was held in the first week of July 2013. Within the duration of four hours, entire polishing and refining processes were observed. Subsequent interviews were carried out in the third and final weeks of July 2013 to clarify further matters regarding process and environmental practices. These interviews lasted for about three hours. In addition to the interviews with the General Manager, several discussions were conducted with operational and executive employees involved in the process for the purpose of data triangulation. This helped to gain and verify information in relation to environmental and sustainability practices within the company.

As secondary sources of data, polishing reports, refining reports, waste summaries, daily energy records, and various documents were analyzed. Further, prior to and after the site visit, company web site, annual report and various relevant online resources were observed. Also, physical artifacts were observed and photographs of the polishing and refining process, equipment and documents were taken with prior approval of the company. Through telephone conversations with the General Manager, issues which arose in the course of analyzing the facts were clarified.

Marginson (2004) stated that in case study approach, when collecting data there should be a point of saturation and to ensure the accuracy of data collected, triangulation can be carried out. In this study, triangulation was ensured through collecting data from both primary and secondary sources. Data collected through interviews, observations, documentary review and physical artifacts were triangulated to improve the trustworthiness of the research work. As stated by Yin (2009), validity and reliability of data was ensured during the data collection process.

The researchers first prepared a process map to understand the production process of this organization (refer Appendix 01). This enabled them to get a better understanding on how the waste is generated and the treatments taken. The data were analyzed based on the different processes involved. During the data analysis process, explanatory case study building approach was undertaken to analyze the multiple data gathered from different sources (Yin, 2009). The next section presents the findings and discussion.

4. Findings and Discussion

The value of the raw materail, i.e., gold can be seen as the major driver towards implementation of sustainability initiatives in the organization under study. After an effective categorisation by gold experts, the unredeemed gold items are devided into two parts as explained in Appendix 01, i.e., salable items and unsalable items. Salable items are sent to showrooms after polishing, cleaning and plating processes. From that process jewelry is upgraded to a salable condition. Balance unsalable items are sent through a melting process and a gold bar is produced as an output, which will in turn provide an income to the organisation.

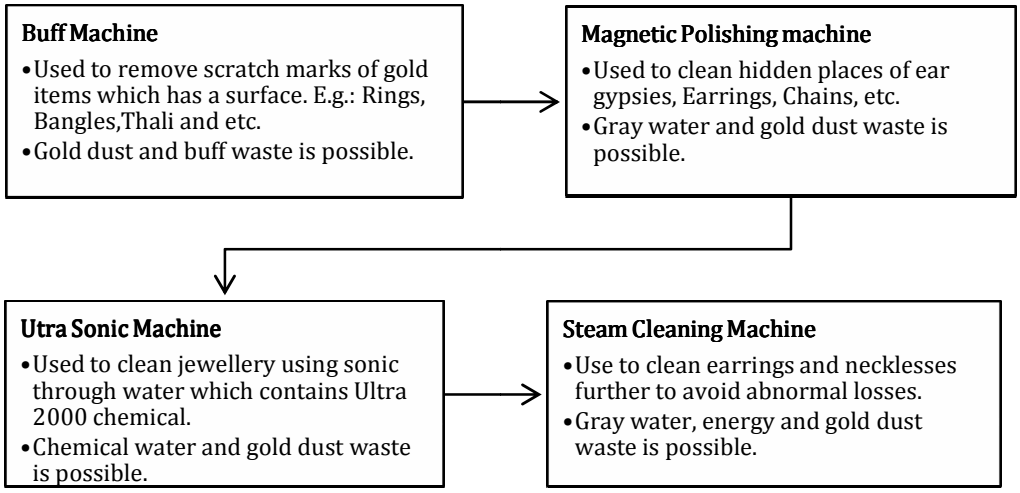
Throughout this process, waste is generated from five major instances. They are a) pollishing and cleaning b) plating c) stone and other material seperation d) cutting and e) melting. Sustainability aspects have been incorporated in each of these processes to ensure the maximum utilization of its most valuable output –gold. The next section describes the sustinability actions taken by this organisation in these five processes.

Polishing and cleaning process

The polishing and cleaning process is depicted by Figure 01 with possible waste that can occur at each stage. In this process, the Buff machine is being used to confiscate scratch marks and polish gold items. A separate tank has been built to collect the gold dust waste generated from this and at the end of a justifiable period, according to the judgement of the professionals involved, this waste is collected, measured and input to the system. A diversified team is involved to ensure the smooth flow and accuracy of measurement. At each year end, the

collected gold dust waste is sent to an outsourced company for cleaning and refining which ultimately leads to a salable by-product. The company is unable to handle the refining process due to lack of technological facilities and knowledge, which ultimately results in abnormal lossses.

Figure 01 - Polishing and cleaning process



Source: Author Constructed

In the magntetic polishing machine, gray water and gold dust is recognized as waste. The gray water is pumped to a sediment tank which is being built in the premises. To collect the gold dust remains in the pins used in the polishing machine, a separate collection is done and the the collected dust is sent to an outsourced company .

In both the Ultra Sonic machine and the Steam Cleaning machine, waste water is generated and it is being pumped to the sediment tank. Additionally the Steam Cleaning machine generates a high heat and the company has failed to use this heat successfully, for a value adding activity of the organization. All these waste management practices have been designed due to the value significance of the material with which the division is dealing. At the end of each process, gold weight variance analysis is done and variance reconciliations are prepared. As far as the polishing process is concerned, base materials (gold items which are having surfaces like rings, bangles), electricity and operating materials (such as equipments, chemical catalysts, equipment cleaning solvents and office and cleaning supplies) are being used. Physical measure of gold dust waste can be illustrated as, *"number of grams of gold lost during the cleaning and polishing*

process of gold items in a batch". Currently, the company measures the weight loss of polished gold items batch wise by preparing polishing reports.

It is clear that accounting and recording of waste is done purely to ensure cost savings. The General Manager stated during the discussion carried out;

> *"These documents are done only for the protection and survival of the division. No one has told us to record anything."*

This confirms that the recording is done to ensure the compliance with internal standards as suggested by IFAC (2005).

The monetary value is assigned to this physical measure by transferring cost to cleaning and polishing activity from pawning. Using the polishing report the calculation can be performed for each batch and for each gold item in that batch considering the variance (the difference between new weight and previous weight) and per gold gram cost. If the entire batch is considered, the cost of lost gold during the cleaning and polishing process would be calculated as:

Cost of lost gold = Variance (in grams and milligrams) × Per gold gram cost

Where,

$$\text{Per gold gram cost} = \frac{\text{Transferred cost from pawning division}}{\text{Transferred weight of that gold item}}$$

Since an extensive cleaning process is being carried out using the Buff machine, the Magnetic Polishing machine, the Ultra Sonic Cleaning machine and the Steam Cleaning machine, wastage is possible from any of these points. Therefore gold wastage, water and energy consumption at individual cleaning stage is measured in physical and monetary terms. This measurement would be more meaningful for effective decision making compared to the analysis of entire process only at the beginning and at the end.

Buff Machine

As Burritt *et al.* (2002) suggest physical EMA information tracks on the use, flows and destinies of energy, water and materials (including wastes). Thus, the amount of gold lost due to the Buff machine cleaning in a respective cleaning batch can be regarded as physical EMA information. EMA The monetary aspect of this physical EMA measurement is derived as below, where the difference between initial weight and the weight after buff polishing is considered to be the gold variance.

The cost of gold variance = Gold variance × Per gold gram cost

Magnetic Polishing Machine

Here, "the amount of gold dust thrown to the sink per each water renewal" can be considered the physically measured EMA information which is then used to calculate "the cost of gold variance" (Weight of gold after buff cleaning – Weight of gold item after magnetic polishing) by incorporating *per gold gram cost.*

In this case, the measurement would be possible as in a normal process the water used for magnetic polishing is renewed after every 4-5 kg of gold cleaned. When throwing water to the sink, through a proper filtering mechanism, gold dust which is mixed with water and magnetic pins is identified and measured. At the same time in this stage, there is an opportunity for accounting for water consumption as "liters of water consumed by magnetic polishing machine per cleaning batch" and monetary value is assigned through "cost of water consumption per batch of magnetic cleaning". This once again reflects the physical and monetary aspects of EMA (Burritt *et al.*, 2002).

Steam Cleaning Machine

When using the high pressure Steam Cleaning Machine in the cleaning process, gold dust as well as steam is spread to the air, and it is not practically possible to measure these wastages. Therefore when accounting for this activity, gold dust waste and water consumption is not effectively incorporated.

Ultra Sonic Cleaning Machine

In the Ultra Sonic Cleaning Machine each batch cleans up to 4-5 kg of gold items and required level of water is measured and used. Therefore measurement of water consumption is easy to find. During the cleaning process of Ultra Sonic machine a chemical called Ultra 2000" mixed with water is released and that water can be measured in physical terms as "liters of chemical mixed water consumed per cleaning batch of gold items". In this scenario, "cost of water consumed per Ultra Sonic Cleaning per batch" and "cost of chemical used (Ultra 2000) per batch of cleaning" can be measured and accounted.

Plating process

Before the gold plating bath, jewelry should be cleaned using HNO_3 and Electro acid. Acid water is pumped in to the sediment tank and finally this water is sent to a basic filtering process to condense the chemical effects before releasing in to the environment. Since gold dust is mixed up with the gray water of every bath tub, the water filtering practice has been introduced to collect the gold dust hidden in the sediments.

Stone and other material separation process

Unsalable items include jewelry with stones, jewelry without stones and normal chains. Before sending these bulks into the melting process, stones, other materials such as threads, metals, elephant hair, etc. should be removed from the items to avoid abnormal losses and to reduce different unpleasant odors harmful to the environment. In this separation process gold dust is created as a waste and it is being collected and entered in-to the system through a systematic measurement process. And the removed stones and materials are packed, which either being used in jewelry manufacturing process or sold.

In removing stones attached to gold items, gold dust is weighed in milligram terms. Since the stone removal is carried out in a covered table, after stone removal of a batch, gold dust remained on the table will be brushed and collected. This can be measured in physical terms as "amount of gold milligrams collected from the stone removal table per batch of melting". And this is multiplied by per gold gram cost which leads to account for the "cost of gold dust collected from stone removal". The accounting for "gold dust collected from stone removal" too reflects the physical and monetary aspects of EMA (Burritt *et al.*, 2002).

After stone removal, the entire cleaning process is required to be carried out before melting gold items, thus all physical and monetary measurements can be applied depending on cleaning machines and activities carried out.

Cutting process

In this process jewelry is cut into small pieces to facilitate gold melting. Since the size of the Inductive Machine is small, cutting into small parts is necessary for a smooth melting process. Here too, gold dust is generated and it is collected in a flat tray during the cutting process. The collected dust is measured, input into the system which ultimately leads to a valuable by-product in the course of the refining procedure.

This cutting process is another possible area of gold loss. At this instance also, gold loss can be measured as "amount of gold lost due to cutting gold items in preparing a batch for melting" and accounted as "cost of gold dust collected from cutting" using the standard measure of per gold gram cost.

Melting process

Items which are being cut in the process and other types of jewelry such as chains, rings and earrings are categorized accordingly. Then they are put into the Inductive Melting Machine following a sequential order. Normally, gold melts at the temperature of 1064^0C which generates a massive heat to the atmosphere which can even be harmful to human beings. This is being addressed by the company via

providing masks to the employees engaged in this process. This represents the company's concern on social sustainability where it tries to protect its work force.

A separate electricity line for this whole process has been activated with effect from February 11, 2013. Therefore electricity consumption can be separately identified from the general electricity cost of the premises. Induction Melting Machine operates using electricity and the company maintains a separate three phase electricity line for melting process. Thus the electricity consumption is easily and accurately measured and accounted by obtaining "the amount of electricity units consumed and monthly electricity cost incurred for melting machine" by looking at the monthly electricity bill.

As described above all gray water is being put into the sink, which is located in the operational premises, and all chemical water and normal water is being pumped into a machine which contains three tanks to filter gray water step by step and at the end filtered water is being sent to a sediment tank which is situated outside the premises. At each month end, gold sediments accumulated in the filtering tanks and outside tank is being sent to an outsourced company for refining. The proper treatment of sediments in this way generates financial benefit to the organization, as there is a considerable value in the gold included in the sediments. Waste water of the sediment tank after a proper purification process is pumped to the national drainage system.

Getting the gold bar washed and cleaned will cause further gold dust loss. This reduction of gold weight can also be measured as "grams/milligrams of gold dust collected in wash basin from gold bars per batch of melting". This would be possible by identifying the washing process separately. Water consumption for the head office and cleaning, polishing and melting process is not segregated since a common water connection line is used for all activities in the premises. However, water cost has not been a burden since the cost is insignificant and the key focus of top management is towards staggering electricity cost. The normal loss of the melting process is decided as 1% by the company management and hence it is just ignored without allocating a monetary value. This practice can be further improved by incorporating a monetary value for the loss as suggested in Material Flow Cost Accounting- MFCA (Strobe and Redmann, 2002; Annett, and Uwe, 2012), accordingly the normal loss value using the positive product output can be as below:

(Weight of gold items in a batch before entering to the melting process * 1% normal loss)	×	Per gold gram cost

In the evaluation of current sustainability practices of the company, it is noted that the company is having a status which is close to a cradle to cradle approach (El-Haggar, 2007). Almost all the wastage that is generated in the polishing and refining of pawning articles is well managed where the company has achieved Economic and Environment pillars of sustainability to a considerable extent. But social sustainability is still at an infant stage. Since the company is refining the pawning articles in the absence of customers to release those, they are producing gold bars and biscuits to the economy which ensures the economic sustainability of the firm. Moreover, all the gold waste generated in this refining process is collected and sent to an outsourced company, which indirectly generates an income to the organization and a value addition to the Gross Domestic Product (GDP).

Environmental sustainability is addressed where the organization ensures that waste water is not directly released to the environment, but a basic refining process is done to make sure the damage is lessened. But as a loophole, it is identified that no practice is undertaken to prevent the release of toxic air to the outer space as highlighted in a full mass balance (IFAC, 2005). Social sustainability also can be seen at a minimal stage where the organization provides safety masks and caps to its employees who engage in this gold refining process. But the company has managed to guarantee a mass balance for the materials used where they account the inputs that are being entered in to the process and the product and non-product outputs come out through the refining of gold.

When evaluating these practices it was observed that the adherence/adoption of sustainable practices within the company is isolated from their current decision making process where the top management is hardly aware of what is going on within this pawning and gold division. This is a mere attempt of the General Manager of the pawning and gold division to ensure that divisional performance is being maintained at maximum level. As per the General Manager,

> *"Four years ago there were nothing like this. Nobody knew what is happening* to the *wastage."*

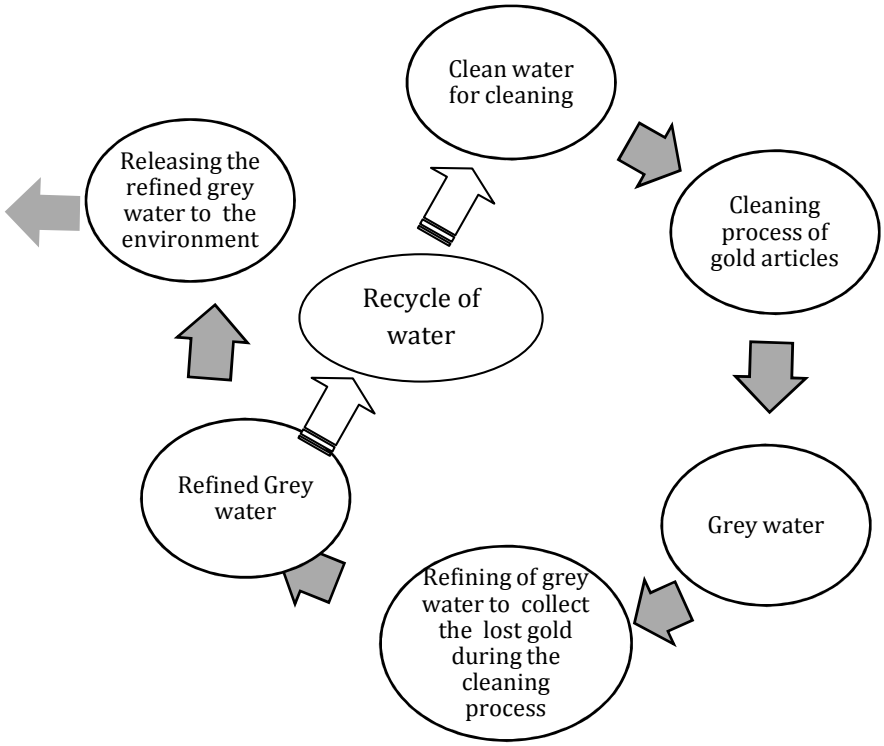
Therefore, the lack of top management support and direction can be seen as a challenge to the sustenance of these waste management practices. According to Subasinghe and Fonseka (2010) there is a strong positive correlation between top managers' awareness of relevance and usefulness of management accounting and the adoption of management accounting practices. Hence, there is a greater possibility where General Manager can make the top level enthusiastic about these sustainable practices currently being adopted and ensure it is embedded to the culture of the organization which ultimately will benefit the organization as a good corporate citizen to serve the economy of Sri Lanka.

5. Conclusions

The case demonstrates how the company thrives to minimize the wastages of the major raw material used in its operations - gold, due to its high scarcity and the high designated value. Further it was noted that the top management is not aware of the practices and there is a lack of integrated strategic approach towards the sustainable practices. Hence it is obvious that the company can further improve the process and adhere to more efficient sustainable practices by referring to the similar organizations internationally as benchmarks. So to improve the sustainability initiatives adopted by the company to a higher level, the following key recommendations have been identified.

The top management lacks awareness, due to the current practices being initiated by the General Manager only very recently . Hence it is apparent that those practices are not embedded into the organizational culture and a part of daily decision making as recommended by Gunarathne and Lee (2013). Top management attention and implementation of complete health and safety measures are the need of the hour for this organization. Moreover, it was observed that the water used for the production process is released to the environment with minimal safety measures, which eventually hinders the social and environmental well-being. So it is suggested to build an improved emphasis on cradle to cradle approach avoiding cradle to grave approach. This can be achieved by using the refined grey water for cleaning purposes again rather than releasing them to the environment as illustrated in Figure 02. In Sri Lanka, the particular process of gold refining and melting is not common. Most related organizations are used to importing the gold necessary for production. Hence, it is a new concept practised among very few companies, making the task of identifying a local company to benchmark and compare practices a difficult task. Due to this limitation and the specialized nature of the process, the recommendations and suggestions for further improvements may not be complete and comprehensive and may require further specialized research for greater improvements.

Figure 02– Cradle to cradle approach of water used in the process



Source: Author Constructed

The research paper identifies only the sustainable accounting practices adhered to achieve economic effectiveness of a particular process. But future research can be done on the organizations engaged to achieve economic, ecological and social aspects of sustainability, both in local industry and internationally. In addition, the accounting aspects of various international organizations in similar scope can be observed in order to make recommendations for the local companies. Studying and drawing conclusions for a single organization without considering the industry or competitors' practices were experienced as drawbacks of case study methodology. Further, restrictions to access the information of the company due to uncontrollable events created detrimental impact to continuation and success of the research work.

References

Annett, B. and Uwe, G. (2012), Energy Cost Accounting: Conventional and Flow-oriented approaches*, Journal of Competitiveness*, Vol. 4 No. 2, pp. 128-144.

Avery, G. C. (2010), *Transforming Organizations towards Sustainable Practices,* Macquarie University, NSW, Australia.

Burritt, R., Hahn, T. and Schaltegger, S. (2002), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review*, Vol. 12 No. 2, pp. 39–50.

Davidson, G. (2011), *Waste Management Practices: Literature Review,* Office of Sustainability, Dalhousie University.

Eccles, R. G. and Serafeim, G. (2013), Sustainability in financial services is not about being green, retrieved on 17.11.2013, via http://blogs.hbr.org/2013/05/sustainability-in-financial-services-is-not-about-being-green/.

El-Haggah, S. (2007), *Sustainable Industrial Design and Waste Management: Cradle-to-cradle for Sustainable Development*, Elsevier Academic Press, London.

Erdas. (2011), Importance of sustainability, retrieved September 16,10.2013, from http://www.erdas.co.uk.

Gummesson, E. (2000), *Qualitative Methods in Management Research,* Sage, UK.

Gunarathne, A. D. N. and Lee K. H. (2014, forthcoming), Environmental Management Accounting (EMA) for Environmental Management and Organizational Change: An Eco-Control Approach*, Journal of Accounting and Organization Change*.

International Federation of Accountants (IFAC), (2005), *International Guidance Document: Environmental Management Accounting,* IFAC, New York, NY.

Marginson, D. E. W. (2004), "The case study, the interview and the issues: a personal reflection: The real life guide to accounting research"*,* In Humphrey. C. and Lee. B. (Ed.). *The Real Life Guide to Accounting Research*, Oxford, UK, pp. 328-338.

National Centre for Sustainability. (2008), Sustainability Victoria, retrieved on 28.08.2013, from http://www.sustainability.vic.gov.au/resources/documents.

Pisano, U. Martinuzzi, A. and Bruckner, B. (2012), The Financial Sector and Sustainable Development, European Sustainable Development Network Quarterly Report, Issue 27, December 2012.

Petrini, M. and Pozzebon, M. (2010), Integrating sustainability into business practices: learning from Brazilian firms, *Brazilian Administration Review*, Vol. 7 No. 04, pp. 362-378.

Scapens, R. W. (2004), "Doing case study research: The real life guide to accounting research"*,* In Humphrey. C. and Lee. B. (Ed.). *The Real Life Guide to Accounting Research*, Oxford, UK, pp. 257-279.

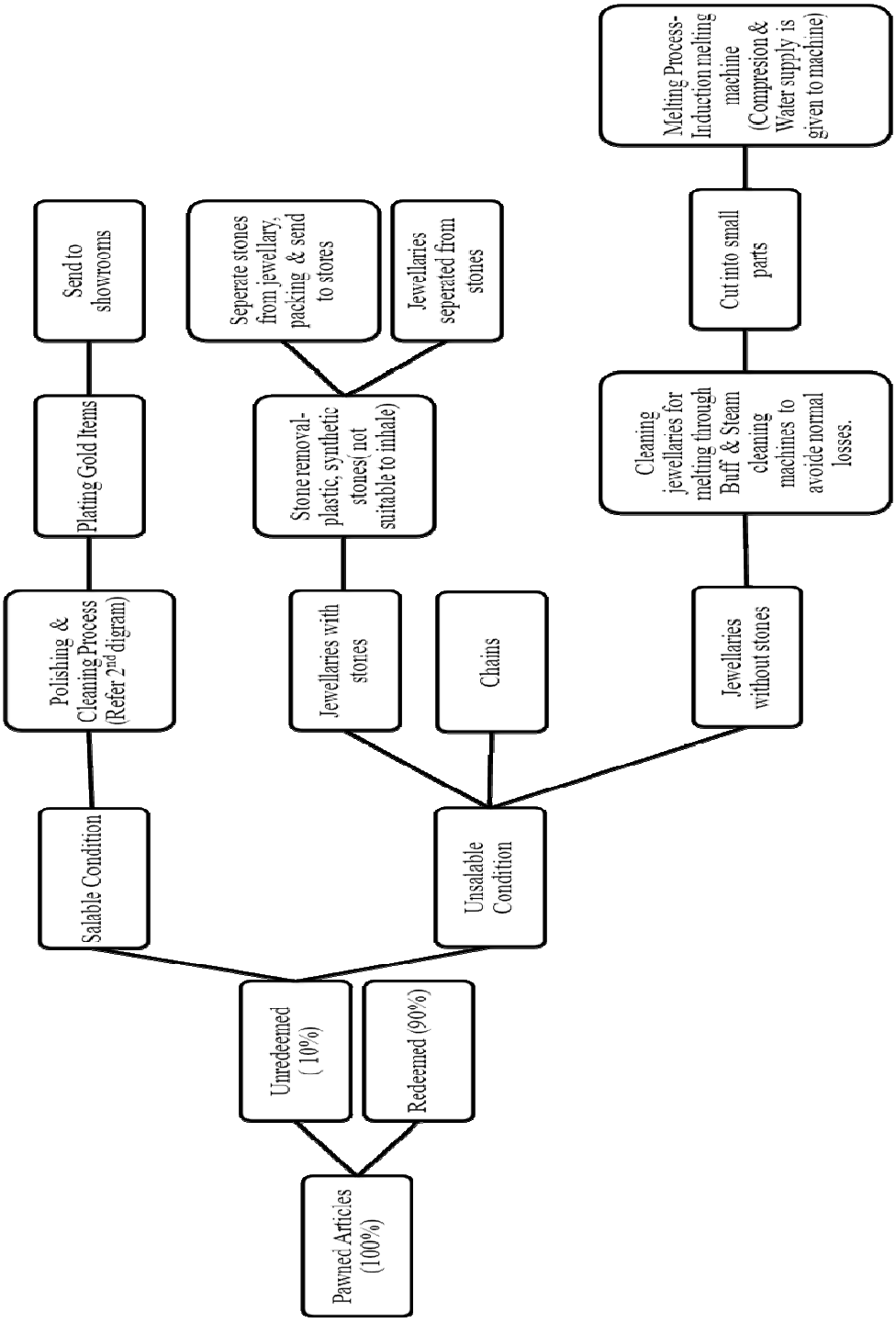
Strobel, M. and Redmann, C. (2002), "Flow Cost Accounting, an accounting approach based on the actual flows of materials", In Bennett, M., Bouma, J. and Wolters T. (Ed.). *Environmental Management Accounting, informational and institutional developments*, Dordrecht, Kluwer, pp. 67–82.

Subasinghe, J. and Fonseka, A. T. (2010), Factors affecting the low level of adoption of management accounting practices by Sri Lankan firms, *Sri Lankan Journal of Management*, Vol. 14/15 No. 4/5, pp. 135-151.

World Commission on Environment and Development (1987), *Our Common Future*, Oxford University Press, Oxford.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

Appendix 01: Production process of this organization



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Integrating Environmental Management Accounting (EMA) Practices with Waste Management: A Case of an Electrical Item Manufacturer in Sri Lanka

Thilakasiri N*, Kurukulasooriya S, De Silva Y, Dias D

Abstract

Purpose – The purpose of the paper is to examine how an electrical item manufacturer in Sri Lanka uses EMA and other practices to manage waste.

Design/methodology/approach – The study followed the case study approach. In-depth interviews, and observations were used as primary sources of data and documentary evidences such as quality manuals, records prepared by the Finance Division, brochures and internal documents along with online resources were used as secondary sources of data. In collecting data, measures were taken to improve trustworthiness. Collected data were analyzed using explanatory building approach.

Findings – Despite the conventional absorption method to absorb waste related costs, the organization currently follows several practices such as cleaner production, Kanban and Kaizen to manage waste. The manufacturer has some physical and monetary accounting practices relevant to recording, measurement and analysis of waste. The study further reveals that the intensity of accounting and environmental management strategies depends on the significance of a particular cost element to the organization.

Research limitations/implications – Since the study covers only a particular electronic item manufacturer, generalizing the findings is somewhat difficult. This is mainly due to the context specific characteristics of the manufacturer. Therefore, the findings will be better suited for organizations in the electronic industry with similar characteristics.

Originality/value – This study aims to contribute to the dearth of research on the application of EMA practices towards waste management in the manufacturing sector of a developing country. The findings will be useful for manufacturing sector organizations to enhance focus on physical and monetary accounting practices towards improving efficiency in waste management.

Keywords- Electronic industry, manufacturing organizations, environmental management accounting practices, Sri Lanka, waste management.

Paper type- Case Study

* Corresponding Author. E-mail: nisansala.thilakasiri@yahoo.com

1. Introduction

In the recent past, environmental management accounting (EMA) has been spreading fast as an interface between management accounting and environmental management strategies organizations pursue (Bennett *et al.,* 2002). Reflecting this wide spread use, various researches on EMA have also been carried out around the world. Many of these researches focus on manufacturing sector organizations (see Kim, 2002; Kokubu and Kurasara 2002; Seuring, 2003; Setthasakko, 2010; Jalaludin, 2011; Lee, 2011) owing to the sector's significant environmental impacts (Moreno *et al*., 2004; Chung and Parker, 2008; Lucas and Wilson, 2008). Specific industries within the sector that have attracted greater attention include heavy manufacturing industries such as energy, mining and paper. Nevertheless, most of these studies have focused on developed countries and little is known about conditions prevailing in developing countries despite their importance in the global economy (Herzig *et al.,* 2012). Bouma and Van deer Veen (2002) suggest that understanding of EMA can be enhanced by extending research into different countries and industries. Thus, in this study an electronic item manufacturer in Sri Lanka has been selected to examine how EMA practices have contributed for waste management. The findings of the study will shed light on the EMA practices in a less researched industry in a developing country.

The electronic industry is a major economic activity in most South-East Asian countries, providing employment to a larger segment of the population and contributing to a major share in the domestic production. However, in Sri Lanka, the electronic industry is still underdeveloped compared to its peers, and only a handful of organizations are engaged in some activity connected with electronics. There are 21 electronics-related industries registered with the Ministry of Industries, Sri Lanka. Further, the major products manufactured by the companies operating under the Board of Investment (BOI) include audio/video equipment & consumer electronics, electric appliances, magnetic heads, high frequency magnetic, telecom and datacom systems, energy safety lamps, electric safety systems, switch mode power supplies, other power electronics products and printed circuit boards. The organization under study is a premier manufacturer and a well-recognized brand name in the electronic power products market in Sri Lanka.

The organization engages in manufacturing, importing and exporting of electric products. It has started operations in 1978 as an Australian - Sri Lankan joint venture with a limited range of switches and sockets produced in simple assembly lines. The turning point for this company was the sale of the venture to a French multinational company and in 2004 the main branch of the organization was established. Currently, it is operating a successful business under the vision of "creating a billion dollar global electrical brand" and the mission of "adding more

life with electricity". Under the guidance of the present CEO, the company has become a successful business venture and a trusted brand name among the customers within a short period of time.

The organization highly appreciates the assurance of quality and customer satisfaction and the company has been awarded the Super Brand status for the superior quality products in 2007. While maintaining quality and customer loyalty they have been able to spread the network to many parts of the globe and currently they are well established in countries such as India, England, Australia, Austria, Korea, Japan, Taiwan, Cypress, Nepal, Maldives, Bangladesh, Pakistan, Singapore, Dubai and Uganda.

The main products of the organization are switches and sockets, compact fluorescent lamps (CFL), low voltage switchgear alpha & sigma, cables, industrial application and other electrical accessories such as electric mountain boxes, electric plug tops, electric lamp holders and electric plug tops. All these products are produced and assembled in the organization's own factory situated in Sri Lanka. Currently, the company consists of around 1000 employees and earns an annual turnover of USD 32 Mn. Recently, a CFL bulb recycling plant has been established as a Corporate Social Responsibility (CSR) project. Presently, the organization has the ISO 9001 and ISO 9002 Certification for quality management system in the manufacture of electrical accessories and is in the process of obtaining ISO: 14000 Certification as well.

The rest of the paper is organized as follows: Section Two presents the literature review of the study and Section Three provides the methodology. This is followed by findings and discussion of the study in Section Four. The last section presents the conclusions.

2. Literature Review

EMA can be identified as the identification, collection, estimation, analysis, internal reporting, and use of materials and energy flow information, environmental cost information, and other cost information for both conventional and environmental decision-making within an organization (United Nations Division for Sustainable Development, 2001). Following a similar approach International Federation of Accountants (IFAC) (2005) defines EMA as the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. Through EMA, both monetary and physical environmental-related information is identified, collected, estimated, analyzed and used for decision making within the organization (Burritt *et al.*, 2002). By expanding this definition, IFAC (2005) has presented a guideline for EMA which uses both monetary and physical information

in internal decision making process. Physical information includes flows and fates of energy, water, and materials (including waste), and monetary information includes environmental related costs, savings and earning (Burritt *et al*., 2002). This results in two types of EMA systems, monetary EMA and physical EMA systems.

Environmental management by firms has two dimensions. It involves firstly, the process of being environmentally pro-active and secondly, the measuring of environmental costs. Being proactive in environmental issues definitely influences product costs. Therefore, firms need to estimate all corporate costs (including environmental costs) for better decision making (Jasch, 2003). Under EMA, costs which remained hidden and scattered in different accounts in conventional accounting systems are identified, classified, allocated, and measured. This prevents firms from overseeing opportunities to obtain environmental improvements (Henri and Journeault, 2008). Therefore, IFAC (2005) indicates that environmental costs need to be captured both internally and externally, while social expenditures need to be considered and collected as social costs or externalities. Companies also need to appropriately identify and measure these costs before allocating them to a single production activity to evaluate reductions in and controls of these costs and contaminants such as wastes, solids, and emissions.

The management of waste has been the central focus of Cleaner Production (CP). According to United Nations Environmental Programme (UNEP) (2014) CP is the continuous application of an integrated environmental strategy to processes, products and services to increase efficiency and reduce risks to humans and the environment. Further, Fresner (1998) views CP as a strategy to prevent emissions at the source and to initiate a continuous preventive improvement of environmental performance of organizations. Also, CP and ISO 14001 support each other in order to reduce waste of an organization. Quantifiable results in terms of reduced wastes and emissions and improved material and energy efficiencies have been recorded by implementing CP around the world (Kjaerheim, 2005).

Managing waste can be challenging for industrial, commercial and institutional (ICI) sectors. Organizations must deal with a wide variety of materials, large volumes of waste and behaviors of many customers and visitors from within and outside of the organization. Davidson (2011) says that, there is no one action that will best fit the needs of all ICI sector organizations. However, a strategic solid waste resource management planning approach will help to define solid solutions. Integrated waste resource management planning enables organizations to create a comprehensive strategy that can remain flexible in light of changing economic, social, material (products and packaging) and environmental conditions.

Operational logistics play an important role in designing a waste management plan. The equipment, human resources, and budgetary requirements of the plan must all be considered in the design process as well as how the plan will be implemented, monitored and reviewed. Davidson (2011) also found that most organizations will require some services provided by commercial waste recycling and composting service providers. With proper research, the contractual relationship with waste service providers can be negotiated to ensure that the contract provisions will allow for the successful implementation of the waste management strategy. Sustainable management of resources is not an easy task for an organization. To reduce and precisely consume the resources while managing the quality is a challenging task. Waste is an obvious factor in this type of large scale organization and managing waste should be concerned thoroughly to gain both financial and non-financial benefits.

Despite the importance of waste, there is a lack of empirical evidences on its accounting side, especially how EMA supports waste management in emerging economies. This study, therefore, focuses on the waste management practices implemented by an electronic item manufacturing company at present. The next section explains the methodology followed in the study to achieve this end.

3. Methodology

The case study method was followed in this exploratory study (Yin, 2009). In collecting data both primary and secondary sources were used. The researchers personally visited the manufacturing facility of the electrical item manufacturer which was situated in a sub urban area in the district of Colombo. Before visiting the plant, an initial interview was conducted with the Factory Manager. Then, the researchers visited the manufacturing plant with an operational manager who clearly explained the production flow. During these observations better understanding was obtained on how the production process is carried out and how waste is generated. Following the observations, several unstructured and semi structured interviews were conducted with employees and the management of the company including Factory Finance Manager (refer Appendix 01 for the interview themes). The researchers also visited the CFL bulb recycling plant which is situated distance little further from the main manufacturing facility. While visiting the plant, the plant manager and the plant operators were interviewed. In addition to these primary mechanisms to collect data, documentary evidences including quality manual and other records prepared by the Finance Division, brochures and other cost and management relevant documents along with online resources were used to collect secondary data. Measures such as use of multiple sources of data, involvement of many researchers in data gathering, etc., were taken to ensure the reliability and validity of the data gathered as suggested by Golafshani (2003) and

Yin (2009). Also we had several follow up meetings with the Finance Manager to fill the information gaps and to obtain further clarifications.

For the purpose of analysis, the researchers used the prevailing EMA concepts and approaches. Initially, an in depth analysis of company practices on cost identification and allocation to the products was done in order to identify how the waste is identified and accounted. Next, a comprehensive comparison was carried out between those results and existing EMA approaches. Particularly, the concepts of CP in were referred to in the analysis. , This analysis helped us to identify the types of waste and the places of waste generation (refer Appendix 02 for the flow of material from raw material acquisition to the final product). Under the explanatory building approach the data gathered through interviews, observations and documentary evidences were analyzed to build up the case (Yin, 2009). The next section provides the findings and discussion of the study.

4. Findings and Discussion

This section provides the data analysis and findings of the study. They are presented under the current accounting practice, CP approach and other EMA oriented practices.

Current practice on cost identification and accounting

Identification of Environmental cost is very much essential for an organization as it accurately allocates costs to the specific area and helps on decision making in many types of management activities such as, product design, capital investments, process design, facility setting, cost control, waste management, purchasing, cost allocation, product pricing and performance evaluation (EPA, 1995; IFAC, 2005).

According to the current practice, the company identifies costs in the conventional way such as direct labor, direct material and overheads. Direct labor includes wages paid to factory workers and direct materials include mainly the cost of Polycarbonate and chemicals. Overheads include factory electricity, water, energy, depreciation of machinery and equipment, repairing and maintenance cost of machinery and packaging materials such as glues, cardboards, and paper. In product costing, the company uses the process costing method and the overhead costs are allocated to products using the absorption rate based on machine hours. The costs of assembly lines are allocated using the absorption rate based on labor hours. Waste is absorbed using an estimated normal loss rate. In this method the overhead costs which are incurred in the factory for all the production processes and other administration processes are absorbed on the same basis to the products. And the waste is treated equally without differentiating between the amounts of waste created by different products. This has resulted in the pooling of

waste related overhead costs as highlighted by IFAC (2005) and Soonawalla (2006).

In cable production, the organization's major cost is the direct material cost which is copper. Copper is a very expensive material which costs Rs. 2,000 per kilo. The copper, in the form of wires, is input to the process and are pressurized under heat and pulled until it become thinner to the width of a cable line. It is done through a specialized machine and the output consists of 2% - 3% waste of copper. Other overheads are absorbed based on the machine hour rate. In terminators production brass and copper are the main inputs. There are two special machines for this production where all the small connectors and other parts for the switches and sockets are produced. The material costs of these are directly identified and other overheads such as energy and water are absorbed on machine hour basis. It creates a waste of used copper and brass dust and a considerable amount of waste water. These costs are also included in the products. The copper and brass dusts are reused by selling them to external parties for production of copper and brass handcrafts.

Production of runners and switch panel is done separately in two machines and it is the only part produced in house in switch creation. The inputs are directly allocated to the costs and electricity is the only energy used for this purpose. Electricity is absorbed in the normal machine hour base as mentioned above. In the runners' production, 52% is a non-product output (see IFAC, 2005) and it is recycled and 20% of the waste is again added to the machine as input. The cost of the waste is absorbed as a normal loss. The organization is not allowed to dispose waste water and chemicals directly to the environment and a cost has to be incurred to refine it before disposing. Since, there is a cost involved in that process, the company uses the refined water for gardening and washing purposes within the factory in a bid to reduce costs of water consumption, it was identified that these costs are hidden under overheads as emphasized by EPA (1995).

The company has incurred a considerable research and development cost by establishing recycling plants as a part of waste reduction. Further, Rs. 1.5 Mn. has been incurred for consultancy services to obtain industrial expertise and support for the betterment of the project. This recycling plant has obtained the ISO 14001 certification as well. All these measures are carried out by the company beyond the compliance on a voluntary basis and can be regarded as volunteer environmental costs (Kim, 2002).

Cleaner production approach

Although the company does not practice CP as a concept, the 3 R's practice, which includes waste management through Reduction at source, Recycling and Reusing,

could be identified within the production process (UNEP, 2014). The application of these approaches is illustrated below.

Source reduction

Source reduction can be achieved either by changing the process or practicing good housekeeping. The organization under study has achieved process change by improving the quality of input materials, better process control, equipment modification and technology change.

Process change through improving input materials has been mainly followed in the cable manufacturing process. Accordingly, the company uses imported copper wires as input raw material. However, currently measures are underway to develop a plant to recycle copper parts collected from outside parties as well. This new venture is expected to reduce cost as well as provide a solution to waste. In this industry, product quality mainly depends on the choice of right raw materials. If the company uses a raw material which does not meet the standard level, at the end of the production after incurring all the costs, the product will be rejected. Hence, the company checks the quality of raw materials from time to time and suppliers are checked once in three months. These measures aimed at improving the quality of input materials have been very effective in managing waste.

Further, the company has changed the process by following better process control. In this regard, human resource has been at the forefront. The employee behavior directly impacts the efficiency and effectiveness of a process. Therefore, the company commenced supervising workers closely by assigning supervisors for each division. This resulted in a higher level of performance compared to earlier times. In addition, supervisors, who ultimately control the behavior of the employees and thereby ensure the processes run smoothly, are motivated through various means. Based on a concept of the Managing Director of the company they conduct annual meditation programs in which Rs.20,000 will be given to each of the employee who participates. The Finance Manager during an interview says;

> *"Employees participate just for monetary benefit but according to our experience there is a direct impact on the production process… Providing a lunch with a vegetarian menu is another approach to develop the morale of the employees."*

The statement of the Finance Manager clearly indicates the benefit of these programs in ensuring better process control while improving employee commitment towards better waste management.

At the end of every operating day, all machines are cleaned using a specific chemical. At the start-up, machines take longer durations to warm up and special

duty allocation has been designed for maintenance staff to report to the job early and prepare the machines for immediate operations. As a control mechanism, production divisions have given a maximum waste percentage and Key Performance Indicators (KPIs) are continuously evaluated on 25th of each month. These measures, perhaps indirectly, too have given a better platform for the organization to reduce/manage waste to a greater extent.

Process change through equipment modification has been achieved in many areas of the manufacturing process, but it is significant in pallet making. In the process of producing pallets and other related parts, the company experiences a high volume of non-product output which is resulted from the design of the moulds (IFAC, 2005). Therefore, the production division staff has redesigned those runners, up to some extent, and expects to develop more in the future. Further, the company has changed the process through changing the technology used. The company is engaged in production of panel boards for commercial customers. In this process they use AutoCAD software to develop the design which offers lesser space for customization. Therefore, currently the company is on the process of implementing new customized software which is expected to reduce waste.

Next approach for source reduction is good housekeeping. This involves with the layout of the factory premises. The company follows 5S concept in their factory. Further, they occupy a professional consultant on lean manufacturing, Total Productive Maintenance (TPM) and further development of 5S. These methods help to minimize unnecessary wastage arising from improper housekeeping and maintenance and avoidable mishaps.

Recycling and reusing

Another aspect of CP is recycling and reusing waste. The company has invested LKR 65 million in setting up a CFL bulb recycling plant. The project, which started as a CSR activity, was largely influenced by the vision of the top management. The company collects the in-house rejected bulbs and market rejected bulbs in addition to the defected bulbs from other manufacturers. These collected bulbs are recycled in a special plant situated in Pitipana. This venture has improved the green image of the company significantly as it is the only CFL bulb recycling plant in Asia. Moreover, some components of the bulbs that come into the Plant for recycling are reused with minor modifications, whenever possible. The main intention of this venture is not revenue generation but the benefit to the society. Despite the massive investment the plant is yet to make profits. During an interview the Plant Manager says;

> *"The revenue generated so far is very little compared to costs incurred… Still we do not have a right mechanism in place to collect the bulbs for the full capacity of the recycling plant. But we are*

> *working on to improve this plant because we believe that the idea it creates in the minds of the stakeholders adds more value than the revenue it creates."*

The statement of the Plant Manger emphasizes that some environmentally oriented initiatives can't be justified in traditional financial based measures. This calls for consideration of broad analysis of costs as suggested by EPA (1995). Despite these issues and the concerns of the finance personnel regarding the viability, the project is carried with the great encouragement of the top management. As IFAC (2005) and EPA (1995) highlight it is clear that some environmentally oriented projects will not be feasible unless the potentially hidden costs/benefits are incorporated.

Other EMA oriented practices

Further, in order to reduce waste and maintain the efficiency level in other parts of production, the company maintains some other physical practices. These include a Kaizen system, a Kanban system, special focus on energy accounting, employee engagement and environmentally oriented capital budgeting system.

The manufacturer is always concerned on Kaizen or continuous improvement of the production and many steps have been taken to reduce the wastes and improve efficiency (Drury, 2006). These steps encompass all over the production process at the point of purchasing of raw material from the suppliers to the finished goods stores. Before approving raw materials the company checks the sample and after the goods are received from the shipment another quality check is done. They always communicate with the suppliers to encourage them to maintain quality in their supplies.

In order to identify the material requirements of the machines the company has implemented a Kanban system. Digital signal boards hung in front of stores give directions on which machine requires what quantity of materials at what time. This system helps the smooth flow of material to the production floor minimizing waste of material, time and energy.

In order to reduce the waste of energy and improve energy efficiency, the company has taken several measures. Reporting of energy consumption is done for electricity as it is the main type of energy used by the company. A unit reader is attached to each machine at the production floor to measure the electricity consumption in units and they report the measurements to the management on a daily basis. They have identified that the nineteen molding machines have the highest consumption of electricity. There are built up rates to absorb the cost based on the consumption. Thus, the accounting for energy reflects the application

of both physical and monetary EMA (Burritt *et al.*, 2002). For the review and analyzing of the information, the management accountants hold a meeting once a month and take necessary steps to control the negative deviations from the targets. The emphasis on energy accounting also plays a key role in managing waste.

Another EMA oriented approach in managing waste is the employee engagement for waste reduction. The aforementioned meditation program inspires to develop the employee morale and improves loyalty towards the company. The Manufacturing Finance Manager in an interview mentions:

> *"The intention of the management is to develop the mental condition of the employees and the program changes the employees a lot… Although they go there without any deep intention of developing morale, they automatically become different persons through it, and their work and attitudes become more positive towards the company. It will help the lower level workers to think out of the box and come up with innovative ideas to improve their day-to-day operations."*

This statement highlights the benefit of these non conventional programs to ensure employee engagement in reducing waste through novel ideas. The contribution of this program towards reducing waste was proven once when an employee came up with an idea to redesign a part of the copper production machine and was able to save around one million rupees with the implementation. As Gunarathne and Lee (2013) identified, continuous employee engagement is the key to success in any environmentally oriented program. This has been further confirmed by Gunarathne and Fonseka (2013) by identifying the human factor as the most important factor in EMA, even surpassing the superiority of the technique being applied.

In order to monitor waste generation, the management of the organization always monitors the deviations in the production run. The raw material inputs which are used in molding machines, the purchased components and the produced components used in assembly lines are measured in quantities and recorded daily in the daily production plan. These recording and accounting aspects reflect the application of physical EMA (Burritt, *et al*, 2002). The estimated output from these inputs and the actual output are measured and the efficiency of each production process or assembly line is measured daily and recorded by the "line leader". Normally the efficiency of an assembly line should be maintained at 85% and if the assembly line achieves it, the employees will be rewarded in monetary incentives.

5. Conclusions

The study identifies that the electronic item manufacturer has mainly concentrated on the reduction of waste of raw materials as the cost of materials represents the single most important cost item. It demonstrates that the intensity of the development of EMA practices depends on the significance of the cost element to an organization or industry. Further, the study shows that certain investments and projects cannot be financially justified unless the broader societal or potentially hidden benefits and costs are taken into account.

The adoption of EMA practices in the organization under study is not without room for improvement. In order to mitigate the prevailing shortfalls in waste management, the company can undertake some actions for improvements. Among them, the potential for redesign of machinery is significant as a substantial amount of waste is generated from the production process due to the design of machinery. Especially in the Runners production machine 52% of the input, comes out as the non-product output. This has been highlighted by IFAC (2005) as a part of waste. This can be reduced by redesigning the machinery. Another avenue for improvement is the application of activity based costing (ABC). Currently, the company practices an assortment of conventional costing and ABC costing initiatives in order to absorb costs for each product. Yet, majority of the overheads are absorbed using general overhead absorption drivers i.e. labor hours and machine hours. Further, the additional activities and associated costs are not considered in determining the overhead rates. For example, the recycling process in the molding section incurs additional costs in terms of energy and water to crush raw materials. But the ignorance of such costs incurred has resulted in pooling of environmental costs in general overheads as highlighted by EPA (1995), IFAC (2005) and Soonawala (2006). If ABC is implemented to the whole process it would help absorb overheads to the product more accurately. Further improvement potential exists to systemize the production floor by centralized material supply and reduce unnecessary movements within the flow through better layout planning. Moreover, the CFL recycling plant can be used as a cause-related marketing tool as highlighted by Kotler (2011). Also as highlighted by Fresner (1998) there is potential to use CP and ISO 14001 together to bring better benefits for the organization.

The study focused on a lesser known manufacturing sector, electronic item manufacturing industry, to broaden the knowledge on EMA in a developing country context. The findings of this study will particularly be useful for other organizations in this industry and other manufacturers in general. However, since this case is based on a single organization, the findings may be difficult to generalize (Lukka and Kasanen, 1995; Enquist *et al.*, 2006). Therefore, in future, more research can be carried out to explore other organizations in the same

industry or different manufacturing industries. In addition to this general issue, another main limitation relates to the limited number of interviews and interviewees involved. However, the quantum of information collected can reasonably be regarded as complete due to the small scale of the organization. Moreover, while interviewing the key parties to collect data we used other means of data gathering such as observations, artifacts, documentary evidences and other sources of secondary data to mitigate any issues with interviews.

References

Bennett, M., Bouma J. J. and Walters T. (2002). "The Development of Environmental Management Accounting: General Introduction and Critical Review", In Bennett, M., Bouma, J. J. and Wolters, T. (Ed.). *Environmental Management Accounting: Informational and Institutional Developments*, Kluwer, Dordrecht, pp. 1-18.

Bennett, M., and James, P. (2000). "The Green Bottom Line". In M. Bennett & P. James (Ed.). *The Green Bottom Line: Environmental Accounting for Management Current Practice and Future Trends*: Greenleaf Publishing, pp. 30-60.

Bouma, J. J. and Van deer Veen, M. V. D. (2002), "Wanted: a theory for Environmental Management Accounting", In Bennett, M., Bouma, J. J. and Wolters, T. (Ed.). *Environmental Management Accounting: Informational and Institutional Development*, Kluwer Academic, Dordrecht, pp. 279-90.

Burritt, R., Hahn, T. and Schaltegger, S. (2002), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review,* Vol. 12 No. 2, pp. 39–50.

Chung, L. H. and Parker L. D. (2008), Integrating hotel environmental strategies with management control: a structuration approach, *Business Strategy and the Environment,* Vol. 17, pp. 272–286.

Davidson, G. (2011), *Waste Management Practices,* Office of Sustainability, Dalhousie University.

Drury, C. (2006). *Management and Cost Accounting,* Thomson Learning Business Press, London.

Enquist, B., Johnson, M. and Skalen, P. (2006), "Adoption of corporate social responsibility – incorporating a stakeholder perspective", *Qualitative Research in Accounting & Management*, Vol. 3 No. 3, pp. 188-207.

Environmental Protection Agency (EPA). (1995), *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA, Washington.

Fresner, J. (1998), Cleaner production as a means for effective environmental management, *Journal of Cleaner Production*, Vol. 6 No. 3–4, pp. 171–179.

Golafshani, N. (2003), Understanding reliability and validity in qualitative research, *The Qualitative Report,* Vol. 8 No. 4, pp. 597-607.

Gunarathne, A. D. N. and Fonseka K. B. M. (2013), *Environmental Management Accounting in the Listed Hotel Sector in Sri Lanka*, working paper, Postgraduate Institute of Management, Colombo.

Gunarathne, N. and Lee, K. (2013), Adopting and Implementing Environmental Management Accounting (EMA) Practices in the Hotel Sector: A Sri Lankan Case, A paper presented at the EMAN Global Conference, Gold Coast, Queensland.

Henri, J. F., and Journeault, M. (2008), Environmental performance indicators: an empirical study of Canadian manufacturing firms, *Journal of Environmental Management,* Vol. 87 No. 1, pp. 165-176.

Herzig, C., Viere, T., Schaltegger, S. and Burritt, R. L. (2012), *Environmental Management Accounting: Case studies of South-East Asian Companies*, Routledge, London.

International Federation of Accountants (IFAC), (2005), *International Guidance Document: Environmental Management Accounting,* IFAC, New York, NY.

Jalaludin, D., Sulaiman, M. and Ahmad, N. N. N. (2011). Understanding Environmental Management Accounting (EMA) adoption: a new institutional sociology perspective. *Social Responsibility Journal*, Vol. 7 No. 4, pp.540-557.

Jasch, C. (2003). The use of Environmental Management Accounting (EMA) for identifying environmental costs. *Journal of Clear Production,* Vol.11 No. 6, pp.667-676.

Kim, J. D. (2002), "A guideline for measurement and reporting of environmental costs", In Bennett, M., Bouma, J. J. and Wolters, T. (Ed.). *Environmental Management Accounting: Informational and Institutional Developments*, Kluwer, Dordrecht, pp. 51-65.

Kjaerheim G. (2005), Cleaner production and sustainability, *Journal of Cleaner Production*, Vol. 13 No. 4, pp. 329–339.

Kokubu, K. and Kurasaka, T. (2002). "Corporate Environmental Accounting: A Japanese Perspective", In Bennett, M., Bouma, J. J. and Wolters, T. (Ed.). *Environmental Management Accounting: Informational and Institutional Developments,* Kluwer, Dordrecht, pp. 161-173.

Kotler, P. (2011), *Marketing Management*, Prentice Hall, NJ.

Lee, K. (2011). Motivations, barriers, and incentives for adopting environmental management (cost) accounting and related guidelines: a study of the Republic of Korea. *Corporate Social Responsibility and Environmental Management*, Vol. 18, pp. 39–49.

Lucas M. T. and Wilson M. A. (2007). Tracking the relationship between environmental management and financial performance in the service industry. *Service Business*, Vol. 2 No. 3, pp. 203-218.

Lukka, K. and Kasanen, E. (1995), Methodological themes: the problem of generalizability: anecdotes and evidence in accounting research, *Accounting, Auditing & Accountability Journal*, Vol. 8 No. 5, pp. 71-90.

Moreno, E. C., Lorente, J. S. and Jime´ Nez, J. D. B. (2004). Environmental strategies in Spanish hotels: contextual factors and performance. *The Service Industries Journal*, Vol. 24 No. 3, pp. 101–130.

Setthasakko, W. (2010). Barriers to the development of environmental management accounting - an exploratory study of pulp and paper companies in Thailand. *Euro Med Journal of Business*, Vol. 5 No. 3, pp. 315-331.

Seuring, S. (2003), "Cost Management in the Textile Chain: Reducing Environmental Impacts and Costs for Green Products", In Bennett, M., Rikhardsson, P. and Schaltegger S. (Ed.). *Environmental Management Accounting - Purpose and Progress,* Kluwer, Dordrecht, pp. 233-256.

Soonawalla, K. (2006), "Environmental Management Accounting", In Bihami, A. (Ed.), *Contemporary Issues in Management accounting* , Oxford University Press; New York, pp. 380-406.

United Nations Division for Sustainable Development. (2001), *Environmental Management Accounting, Procedures and Principles*, United Nations Publications, New York and Geneva.

United Nations Environmental Programme (UNEP) (2014), Cleaner production, retrieved on 12.02.2014 via http://www.unep.fr/scp/cp/.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

Appendix 01

Summarized list of interview themes

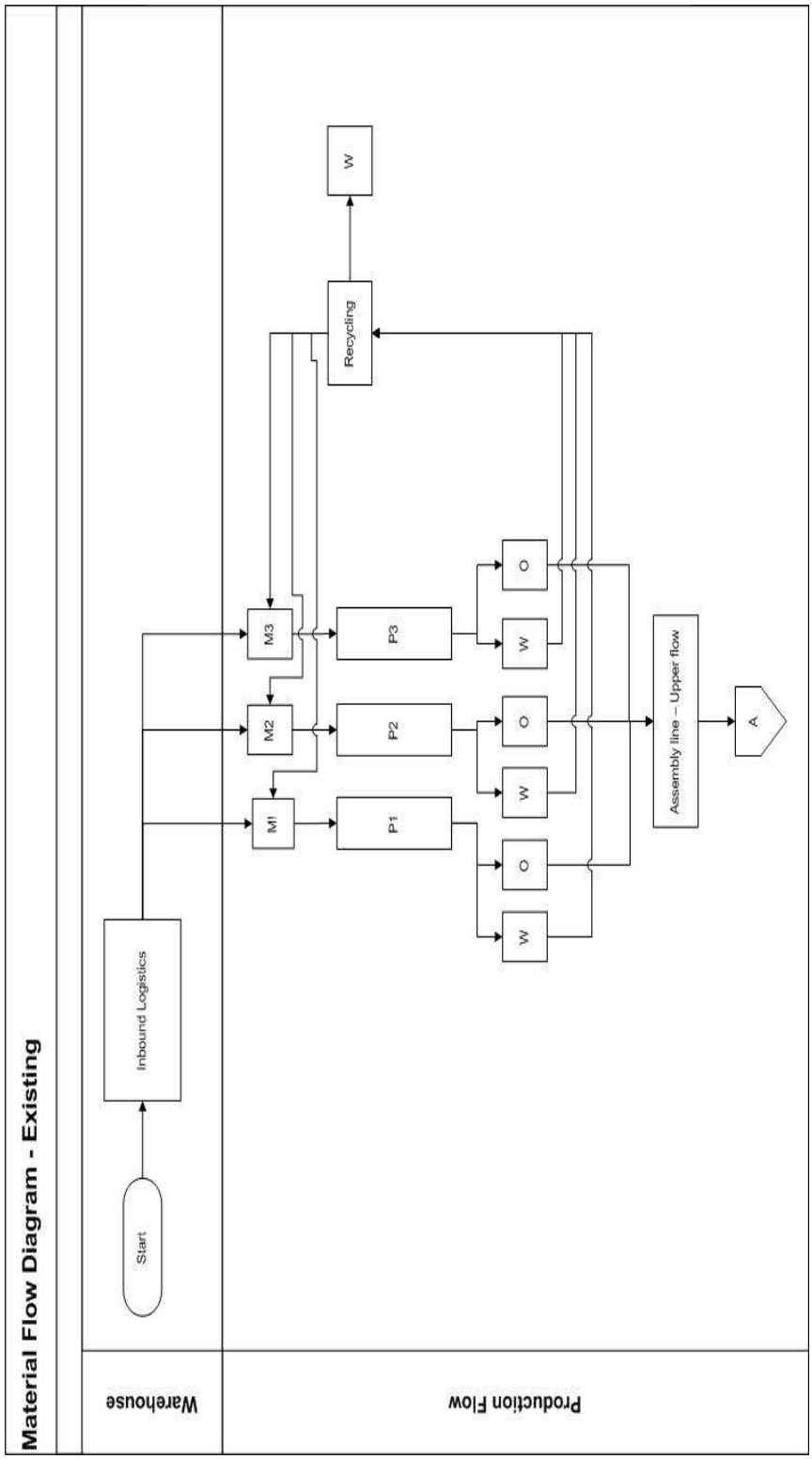
Regarding the current practices:

- How do you identify waste in production?
- What is your costing method of waste?
- How do you manage waste?
- What are the other environmentally oriented practices?
- To what extent do you follow the 3R concept in waste management?

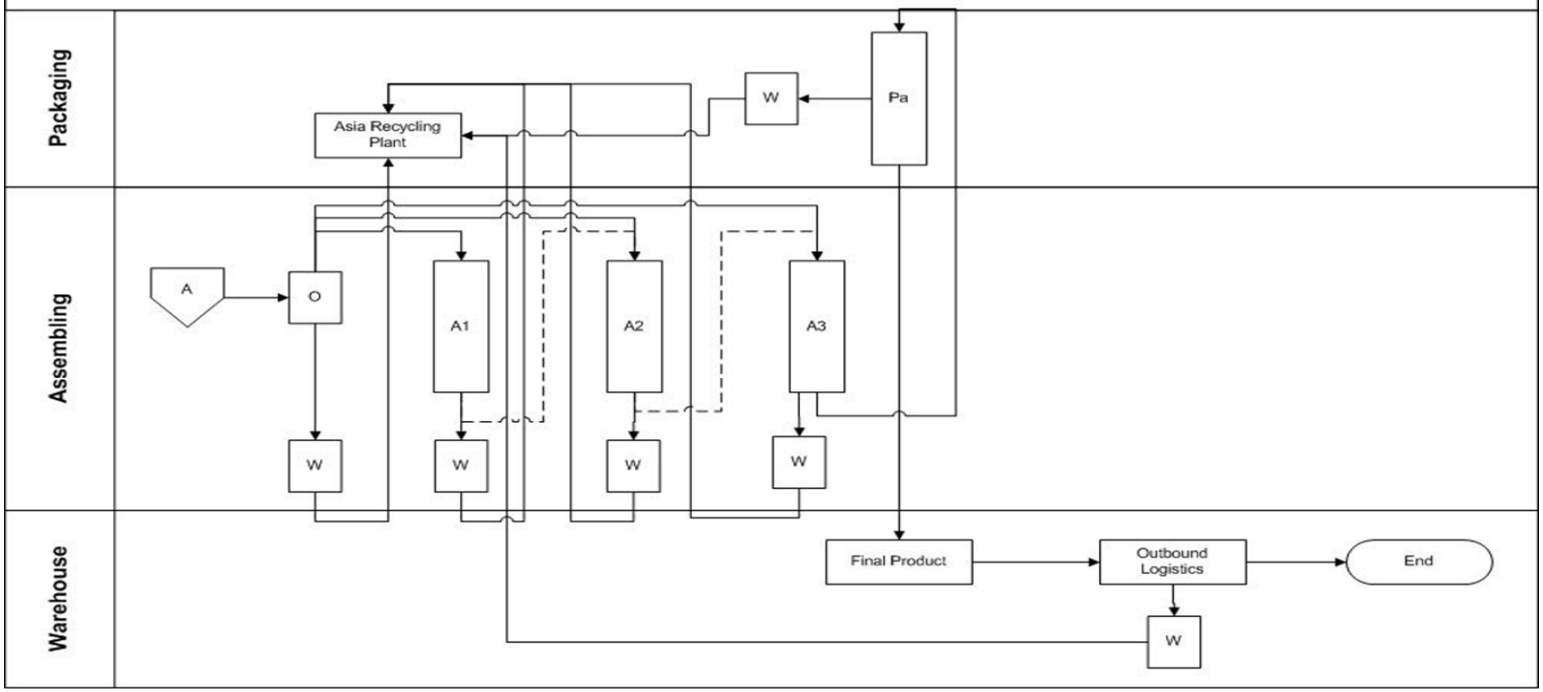
Regarding the employee support and the challenges:

- How do you get the employee support for the practices?
- What are the challenges you face?
- What are the improvements you plan to make?
- What are the future plans?

Appendix 02 – Material Flow Diagram



Material Flow Diagram – Existing contd'



Abbreviations

M	- Raw Materials, Auxiliary materials, Water, Entergy, other materials
P	-Production
O	- Output
W	- Waste
A	- Assembling
Pa	- Packaging

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Adopting and Implementing Waste Management Practices in the Printing Industry: A Sri Lankan Case

Cooray N*, Murshidha F, Senanayake N, Prashanty R, Rathnasinghe U, Dharmika J

Abstract

Purpose –The purpose of this paper is to examine why and to what extent a printing company in Sri Lanka adopts and implements waste management practices.

Design/methodology/approach-The study employed the case study method. The annual report provided the basis as the starting point of information for the study. Thereafter, the primary data were collected by conducting semi structured interviews which were supported by the researchers' observations at the factory premises. Further, as secondary sources of data company web site, magazines and handouts issued were used.

Findings –The study identifies that the printing company had started waste management practices with a view of supporting its profit maximization motive. The company has managed to continue waste management practices in a *holistic manner* during last three years. The study demonstrates how waste management systems can be applied successfully, despite initial challenges.

Research limitations/implications – The results of the study are difficult to generalize due to the contextual characteristics which are unique to this company and its environment.

Originality/value – The paper attempts to fill the paucity of research in the printing industry in developing countries especially in emerging South Asian countries. The findings of the study will be useful for the organizations to develop and maintain sound waste management systems, particularly in the printing industry.

Keywords- Developing countries; environmental management accounting; printing industry; waste management.

Paper type- Case Study

*Corresponding Author: E-mail: nimesha.cooray@yahoo.com

1. Introduction

Increased attention towards the environment arose as a result of major industrial accidents, climate change and deforestation which in turn emphasized the importance of the 'Green Concepts' for organizations across the globe. The businesses which affect and being affected by the environment in an unavoidable manner had to respond to this situation. In this context, the business corporations were attempting to incorporate the environmental considerations into their main businesses operations in order to create more value to its customers and for the society at large. These initiatives resulted in, environmental management actions or strategies pursued by many organizations. Such initiatives have been supported by an efficient and effective environmental management accounting (EMA) system which has emerged as an interface between management accounting and environmental management (Bennett *et al.*, 2002). Since the origin, the researchers have been digging deep into the different perspectives of EMA through their studies. But most of these studies have been focusing on developed countries which resulted in an information gap between developed countries and developing countries. Hence, our analysis attempts to understand the development and implementation of EMA systems to support the waste management practices in developing countries like Sri Lanka. Thus, the objective of this study is to examine why and to what extent a printing company in Sri Lanka adopts and implements the waste management practices and related EMA practices.

The importance of printing industry cannot be undermined for number of reasons. Generally, the printing sector is considered as one of the industrial sectors with high potential impacts on the environment due to its usage of various types of raw materials and chemicals and generation of a large amount of industrial waste such as chemical waste and gray water. As the environmental pressures faced by the printers are intensifying, the importance of environmental management in the printing sector gradually improves. As stated by the Sri Lanka Association of Printers (2013), there are about 264 companies registered under the Sri Lanka Association of Printers, which can be recognized as the authoritative body representing the interests of the printing community in Sri Lanka. By considering these facts and circumstances, we resolved to select an organization operating in the printing industry in Sri Lanka which has adopted considerable number of initiatives to be environmentally-friendly while making a product valued by the customers.

This printing company was founded in 1979, as a company which tried to add value to the tea products by shipping tea in a pre-packaged form. This pioneering step made the company to grow further by adding quality into their products day by day. Later the company diversified into other printing areas such as cartons and labels, tea bags, tags, prepaid phone cards and other digital media services.

Currently the company operates as a group which has its main plant at Kelaniya and two operating subsidiaries in Kadawatha and two overseas companies in India. The current portfolio of customers of the company includes MAS Holdings, Tesco, McDonald's and Marks and Spencer and they distribute their products over five continents.

As mentioned above, this printing company produces for renowned brands all over the world. Therefore, the environmental concerns have become very crucial for this organization due to the customer pressure. On the other hand, without considering all the environment related aspects, it was concluded to concentrate on one particular aspect, namely 'waste management'. In this study we selected waste management due to two reasons, a) its high relative importance to profit maximization objective and b) the ease of gaining access to relevant information.

The recent studies have focused on how environmental attitudes have evolved and what ways companies chose to respond. A recent study (Kyocera Environmental Survey, 2011) reveals that the current economic situation, which has given rise to a renewed emphasis on longer-term savings, has motivated increased emphasis on efficiency and related green concerns. It was employers' concerns over rising energy costs that shared at the organizational level which supported the waste reduction and energy efficiency in a considerable manner. Further, the printing industry often carries with them the increased generation of materials that, if improperly dealt with, can threaten both public health and environment which will doubt the going concern of the business. In light of these reasons, it is an inevitable responsibility that a printing company manages its waste with a greater care.

The rest of the paper is organized as follows; The Section Two presents the literature review of the study which is then followed by the research methodology in Section Three. The Section Four provides the findings and discussion. The last section provides the conclusions.

2. Literature Review

The term EMA has been defined by different persons in different ways (International Federation of Accountants-IFAC, 2005; Burritt *et al.*, 2002; Environmental Protection Agency- EPA, 1995). However, the definition given in the IFAC, Statement of Management Accounting Concepts (2005) has received a considerable attention from various researchers all around the world. According to IFAC, EMA is defined as "the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices" (p.19).

In brief, the various definitions given by different persons divide environment-related costs and physical flows in different ways and some of these definitions consider externalities as a component of the cost while others disqualify externalities as part of EMA cost (IFAC, 2005; EPA, 1995). However, it can be concluded that the overall objective of EMA is to include environment-related costs into decision making at every level in the organization. This poses the challenge on many organizations on what types of costs to be considered as environment-related costs. As per the IFAC (2005), organizations define environment-related costs differently, depending on the intended uses of the cost information, an organization's view of what is "environmental," its economic and environmental goals and other reasons.

In the EMA literature there are many studies on the printing and packaging industry covering a broad range of printing types (Pferdehirt, 1993; Davis, 2001; Rothenberg, 2002). This may be due to the relative importance of this particular industry in both global and the national economy. According to the report published by the Department of Environment and Conservation NSW (2006), the need for organizations operating in printing industry to follow EMA basically stems from the nature of raw materials and chemicals used and the different types wastes generated.

Among many other aspects of EMA, waste management is a major area which has been the primary area of focus by many researchers. According to IFAC (2005), waste can be identified as the materials that were intended to go into final product but became waste instead because of product design issues, operating inefficiencies, quality issues, etc. When focusing on the printing and packaging industry, printers usually generate an array of both hazardous and non-hazardous waste as outputs of their manufacturing processes. As per EPA (1995), hazardous waste is liquid, solid, contained gas, or sludge wastes that contain properties which are dangerous or potentially harmful to human health or the environment.

Due to the importance of waste in the printing and packaging industry in a country like Sri Lanka, in this study, we focused on waste management practices and how the systematic implementation of these practices with the help of EMA enables an organization to become efficient in managing waste.

3. Methodology

The case study method is flexible, producing diverse research outcomes (Darke *et al.*, 1998), and supporting all types of philosophical paradigms. Case studies can be exploratory, descriptive or explanatory (Yin, 2009). They can be intrinsic, instrumental (providing insight into an issue or situation of concern) or collective - based on more than one site (Stake, 2000). In order to carry out this study we

selected the case study method because the cases presented in our study conform to the above situations. Further, case studies investigate a contemporary phenomenon in a real-life setting, and the focus is on organizational and managerial (rather than technical) issues (Myers, 2003). This can be elaborated as another reason for selecting the case study method in our study.

Primary as well as the secondary data collection methods were used in the study. First, we used the secondary data sources such as the website of the company, its sustainability report and other magazines to understand about the company and its enthusiasm towards waste management systems. This also shed some initial light on different forms of waste generated by the company, disposal methods of those waste streams and environment protection expenditure, etc. An interview guideline was prepared based on the understanding gathered during the secondary data collection process which was used as a guide when conducting interviews (refer Appendix 01).

Our observations at the factory paved the way to realize how the printing process is actually taking place at the Company. The company's daily process of carrying out its operations and handling waste were thoroughly observed. Semi structured interviews were conducted with the Managing Director, Quality Assurance Manager, Finance Manager, Brand Executive and the Accountant. These professionals were inquired with regard to the initiative for waste management, continuous improvement, information systems and challenges faced by the company.

A 'Process Chart' was developed with the understanding obtained through interviews and observation. The process chart was used to identify all the waste sources of the company and the remedies for such wastes. Subsequently, the annual report of the company for the latest year was analyzed to collect some more information in order to understand the printing industry and its operations. Through that we got ourselves familiarized with the concepts such as Lean Printing, , Ink Management, Dumping systems, etc.

After obtaining insights into the printing industry and the company's operations, the second interview was conducted with a view of solving the clarifications and obtaining further information such as recording the waste, key performance indicators, information system to support the waste reporting and practical problems faced. Thereafter, the industry knowledge of best practices was applied to the case in order to identify the current scenario and make recommendations. The explanation building approach as suggested by Yin (2009) was followed to build up the story of the case. The next section provides the results of the data analysis and the discussion of the study.

4. Findings and Discussion

This section provides the findings and the discussion of the study in terms of drivers of waste management adoption, EMA practices and its continuous improvement and the challenges faced.

Drivers for waste management adoption

Even though the company started its operations in 1979, it has taken steps to dopt practices to protect the environment and the society in a more sustainable way, three years ago with the ISO 14001 Certification. The drivers which made the company to be one of the best companies which manages its waste in an environmental friendly manner are as follows (refer Table 01). These drivers can be broadly divided as internal and external.

Table 01: Drivers of waste management practices

Driver	Source
Internal	Profit maximization motive Top management attitude
External	International certification Increased demand for green products Regulatory pressures

Source: Author Constructed

Internal drivers

As the internal drivers of sustainability practice of this company, the profit maximization motive and top management attitude can be considered.

The company has identified that waste management as a profit maximization tool. They realized that waste is money they are throwing away and in order to avoid this situation they had to implement waste management practices. The General Manager of the company emphasized that,

> "Business is not charity; we should be accountable for the money of shareholders; therefore it should maximize the profit."

Further, the Chairman of the company has mentioned in his message to the annual report as follows,

> "We believe that businesses acting as businesses, not charitable donors, are the most powerful force for addressing the pressing issues we face."

These statements confirm that the main drive of waste management practices of this organization is profit maximization objective. This has been identified as the

business case of sustainability initiatives (IFAC, 2005; Schaltegger and Burritt, 2006).

Another important driver of environmental practices of this company is the top management's commitment or attitude. In this regard, the Company's top management has understood that they can't change the organization overnight. Therefore, they perceive waste management initiatives as a set of behaviors and actions that should be integrated with the business strategy of the Company and that should also be reflected in their culture. Further, the company considers its sustainability targets not as a destination but as a moving target which inspires them to improve every day.

External drivers

As the external drivers of sustainability practice of this company, international certification accreditation, increased demand for green products and regulatory pressures can be considered.

The introduction of ISO 14001 has invited the company to take a step further to consider about the environment rather than undertaking only traditional business activities. Further, the company has certified itself as a FSC (Forest Stewardship Council) & PEFC (The Programme for the Endorsement of Forest Certification) Chain of Custody certification (COC) to ensure that certified material from sustainable forests are not mixed with non-certified material at any point in the supply chain to the end consumer. The company, being the first in the country to achieve FSC certification, has accomplished one move in the journey of becoming a benchmark with respect to environmental responsibility. These certifications have become a catalyst for surviving and wining the discerning customers in the market.

Company uses its waste management process as a way of approaching environmentally friendly markets. Nowadays customers are more concerned about protecting the environment and they prefer to use environmental friendly products. Especially foreign customers are willing to pay premium prices for green products. The company has adopted these practices to attract more orders at premium prices from customers who value green products.

Another important drive of these practices at this company has been the regulatory pressure, as highlighted by Medley (1997) and Schaltegger and Burritt (2006). The company is of the view that some environmental projects or waste management projects may not be profitable as far as only the financial costs and benefits are considered. But these projects are certainly profitable and essential for the company when the possible litigations are taken into consideration.

EMA practices

As mentioned already, the company pays much attention to cost saving by focusing on adopting a comprehensive waste management system by reducing waste where possible and increasing the reuse and recycling of resources. The company's information systems keep records of various types of waste materials which are generated within the company. These waste streams are separately measured with the help of an EMA system. The total non-hazardous waste is given in kilograms and numbers below (refer Table 02).

Table 02: Physical information of the production waste of the company

Waste type	2013	2012
Non-Hazardous waste (kg) treatment plant.	3,464,930	3,342,546
Non-Hazardous waste (No's)	28,639	18,067

Source: Annual Reports of the Company (2013 and 2012)

From the above table it is clear that the EMA system provides mainly physical information (Burritt *et al.*, 2002). Further the company clearly identifies different types of waste streams generated and there is a well-defined management process in place for these wastes. Details of the different forms of waste generated and waste management strategies implemented by the company in the year of 2012 are presented below (refer Table 03).

Table 03: Different types of waste and the its disposal method

Waste type	Disposal method
Paper & cardboard (Kg's)	4% Sold for reuse, 96% Recycled
Polythene & plastic, Used offset plates and Scrap Iron (Kg's)	Recycled
Shredded Boards and Contaminated Cotton Waste (Kg's)	Discarded
Paper Cores, Golf foil and waste oil(Kg's)	Sold for reuse
Iron Barrels & Tins, Used Blankets Wooden Pallets Hard Board Scrap Machine Plastic pallets (No's)	Sold for reuse

Source: Annual Report of the Company (2013)

Further the company keeps record of the cost incurred for the waste management activities reflecting the use of monetary EMA information (Burritt *et al.*, 2002) it has incurred a total of Rs.2,262,060 for protecting the environment in the financial year 2013. In that Rs.1,521,089 was paid for upgrading the new treatment plant. The company's accounting for waste thus reflects monetary and physical EMA systems as accounts are kept in both financial and physical terms (Bennett and James, 1997; Burritt *et al.*, 2002).

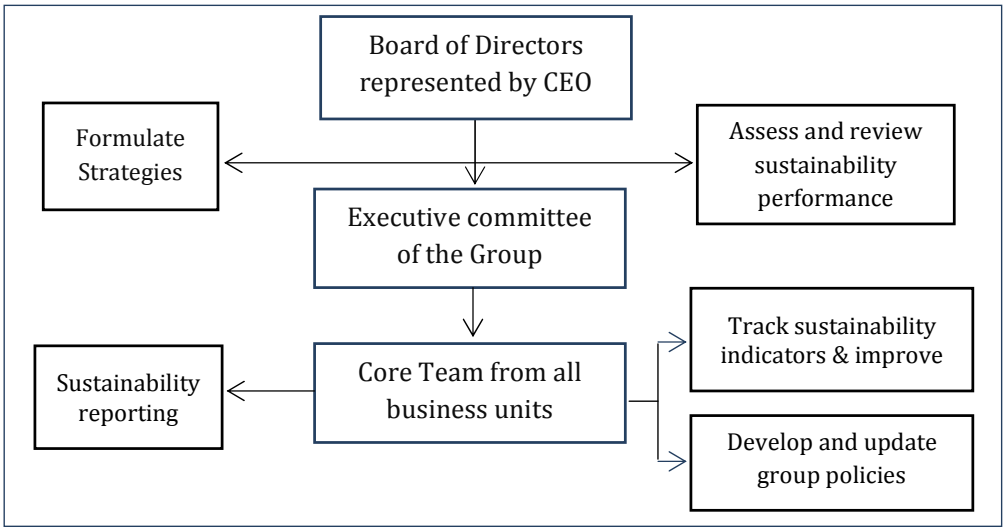
Further, the company's ERP system calculates the average waste expected based on the previous production. Extra material is decided based on this average waste rate. Thereafter it is the duty of the factory manager to make sure that they do not exceed this waste. If there have been five continuous instances where the order was performed below waste levels, then the average waste rate is reduced with an aim of reducing more waste. The above explained waste management practices are a part of the company's EMA practices that include accounting for material, energy, water, oil, waste and etc. (Bennett and James, 1997). The Sustainability Report published by the company is a tool that accounts for environmental, social and economic impact of the company.

Continuous improvement of environmental management/EMA practices

In order to sustain and continuously improve the above mentioned environmental/EMA initiatives the company adopts various strategies such as top down management approach, performance evaluation system, its comprehensive information system, continuous awareness programs, and involvement of green teams. This section explains these strategies in detail.

The company follows a top down approach to implement these sustainability practices in the organization. The sustainability committee which is headed by the managing director with the participation of representatives from each section of the company is involved in improving the sustainability performance. Further they make sure that 'continuous monitoring and evaluation' is a part of their sustainability targets. The company's sustainability management approach is depicted below (refer Figure 01).

Figure 01: Top down sustainability management approach



Source: Adopted from the Annual Report (2013)

Another strategy followed by the company to sustain the environmental management practices is to link its performance evaluation system to the production waste. The performance evaluation is linked to different type of waste of the company. This could be the paper waste machine break down etc. For an example the engineering team has to make sure that the machine break down is below 2% of its running hours. Likewise specific targets are given to each section of the company in order to make sure the continuous implementation of the waste management processes.

The sophisticated information system of the company also plays a key role in sustaining these practices. The ERP system of the company is the main information system that assists the waste management initiative of the company. It automatically calculates the waste percentages to each order and this percentage will be used as a key performance indicator for the production section of the company. As mentioned in the annual report, the green environment is maintained through the "Continuous improvement in environmental aspects by establishing responsibility, objectives and targets and reviewing environmental performance". During the year 2013, the company has implemented a system to generate purchase orders through the system automatically and email to suppliers. This paperless ordering system has saved a significant amount of paper at the office premises. Further the company monitors the usage of water by auditing all the processes that use water. Separate meter readings are done in order to make this reading.

The company is in the view that the laymen of the company are the main source of eliminating the waste from the company. Therefore, the company always makes sure that the employees have the required knowledge and expertise of managing the waste at their work. The management of the company ensures that they exert the correct level of pressure on to the employees to be successful in the waste management process by way of environmental audits and targets. Further the company makes sure that it identifies and develops leadership capabilities of employees to perform effectively. Thereby the company expects the employees to be the leaders of environmentally friendly performance. The incentive policies are managed so that the employees will be awarded on the basis of their environmental performance.

Sustainable waste management practices require new ideas on how to improve the current situation to achieve a better position tomorrow. Therefore, the company came up with a solution by means of forming a 'Green Team' in order to discuss the progress of the sustainability practices of the company. Green team came in to existence to drive the ISO 14001 and consists of representatives from different departments. The team meets periodically to discuss the upcoming issues in terms

of environmental impact. The green team's duties are to assess and identify the highest environmental impact, design and implementation of initiatives to reduce the environmental impact and obtain feedback on the initiatives implemented.

Further, in order to generate new ideas, an incentive scheme was designed to recognize the employees who come up with new ideas of waste management. For example, in the last year, a group of employees was awarded for coming up of an idea of a new heating system.

In sustaining and continuously improving these practices, the company faces many hurdles or challenges. The next section explains these challenges.

The challenges faced

The Company faced numerous challenges in attempting to adopt waste management practices. A main problem the company faced was the lack of information with regard to waste initially. This problem was solved later by way of a successful implementation of an ERP system. In addition to the management technical/informational aspect of implementation another major challenge was the management of stakeholders at different levels backgrounds. In implementing these sustainable management practices, the company requires the continuous engagement of all the stakeholders on a regular basis as highlighted by Gunarathne and Lee (2013). For an instance the attitude of the employees had to be changed in order to reduce the waste. The higher management makes sure that they put pressure on the employees which ultimately results in a change of attitude by way of ISO audits and other targets to be maintained. Incentive schemes were linked to the waste management systems. In addition, a Green Team has been established with the participation of the employees representing all the parts of the organization in order to make recommendations and discuss the issues with regard to the sustainable management practices.

In engaging and encouraging suppliers the company also took several steps. Contracts have been established between the company and the recyclers and suppliers in order to make sure the continuous success of the waste management of the company. The company entered into the contracts with the suppliers who have FSC (Forest Certification) so that those suppliers make sure that the waste given to them is handled with care.

5. Conclusions

The paper demonstrates how companies in Sri Lankan printing industry implements waste management practices. It also discusses how these various practices are continuously sustained amidst challenges it faces. It was evident that the existence of a proper EMA system helps the company to successfully

implement its initiative of waste management. By examining its current practices some recommendations for a more successful waste management strategy can be spelled out.

A highly recommended solution to reduce the waste is to automate the production process which is used by most of the countries. In current context the plant has some automated parts but not that the whole process is linked and automated. It was recommended to draw up a value map so that the company can identify which activity need to be given priority in terms of automation. Compaction and dumping system and the ink waste management systems were among the other recommendations. Waste water management system of the plant should have been extended to the office premises and the rain water harvesting can be used as another way of handling water with care.

Changes to incentive policies and implementation of sustainability balanced scorecard were suggested to motivate the employees for the environmental friendly initiatives. The research found that the implementation of integrated reporting and including the indirect impact of the production waste can enhance the quality of sustainability reporting of the company. The proportions and the financial measures related to waste could not be obtained in conducting the study as those are of high confidentiality and competitiveness. A better understanding could have been obtained and the solutions could have been made in a comprehensive manner had this information given. Further this case study did not look in to the reporting systems of the company in depth. In-depth analysis into the waste management information systems / EMA systems together with a higher level of engineering background could have made the study more relevant and beneficial.

References

Burritt, R., Hahn, T. and Schaltegger, S. (2002), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review,* Vol. 12 No. 2, pp. 39–50.

Darke, P., Shanks, G. and Broadbent, M. (1998), Successfully completing case study research: combining rigor, relevance and pragmatism. *Information Systems Journal*, Vol. 8, pp. 273-289.

Davis, S. (2001), *Waste Reduction in the Screen Printing Industry*, Kansas State University, Kensas.

Department of Environment and Conservation - NSW. (2006), *Environmental Action for the Printing Industry*, Department of Environment and Conservation NSW, Australia.

Environmental Protection Agency (EPA). (1995), *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA, Washington.

Frank , F., Tobias, H., Stefan, S. and Marcus, W. (2002), *The Sustainability Balanced Scorecard – Linking Sustainability Management to Business Strategy*, Wiley InterScience.

Gary D. M. and William, J. (1994), *Ink and Cleaner Waste Reduction Evaluation for Flexographic Printers*, TR 12, WMRC Reports, Champaign, IL.

Gunarathne, N. and Lee, K. (2013), Adopting and Implementing Environmental Management Accounting (EMA) Practices in the Hotel Sector: A Sri Lankan Case, A paper presented at the EMAN Global Conference, Gold Coast, Queensland.

International Federation of Accountants (IFAC). (2005), *International Guidance Document: Environmental Management Accounting*, IFAC, New York, NY.

Kyocera Environmental Survey. (2011), *Rethinking printing*, Loudhouse Research, United Kingdom.

Medley, P. (1997), Environmental accounting – what does it mean to professional accountants?, *Accounting, Auditing & Accountability Journal,* Vol. 10 No. 4, pp. 594-600.

Myers, M. D. (2003), Qualitative Research in Information Systems, *MIS Quarterly*, Vol. 21 No. 2, pp. 241-2.

Pferdehirt, W. P (1993), Case study: roll the presses but hold the wastes: P2 and the printing industry, *Pollution Prevention Review*, Autumn, pp. 52-57.

Rothenberg, S., Toribio, R. and Becker, M. (2002), *Environmental Management in Lithographic Printing*, Rochester Institute of Technology, Printing Industry Center, New York.

Schaltegger, S. and Burritt, R. (2006), "Corporate Sustainability Accounting", In Schaltegger, S., Bennett, M. and Burritt, R. (Ed.). *Sustainability Accounting and Reporting*, Dordrecht, Springer, pp. 37-59.

Sri Lanka Association of Printers. (2013), Printing companies list, retrieved on 15.11.2013, via http://www.srilankaprint.com/english/printers_details_2011/english.html.

Stake, R. E. (2000). "The case study method in social inquiry". In Gomm, R., Hammersley, M. and Foster, P., (Ed.). *Case Study Method: Key Issues, Key Texts*. Sage, London, pp. 20-26.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

Appendix 01

Summarized themes of the interview questions:

- How did you start the waste management system (reasons and founders)?
- How did the first time adoption of waste management practices affect the company and its employees (Problems faced, corporation, and changes to organizational culture)?
- What types of wastage do you collect (categorizations, control systems, etc)?
- How do you manage waste?
- What is the role of accountants in waste management?
- What are the benefits received through implementation of waste management systems?

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An Analysis of Energy Management Practices and Accounting Implications in the Hotel Sector: A Sri Lankan Case Study

Hendahewa S M, Jayasinghe J M R P*, Pannilarathne P T, Wijewickrama M K P, Withanage C M

Abstract

Purpose – The purpose of this paper is to examine energy conservation initiatives implemented and physical/monetary environmental management accounting practices adopted in relation to energy management in the context of a Sri Lankan hotel.

Design/methodology/approach –A single case study approach was adopted for this study. Primary data were collected by conducting semi structured interviews with hotel staff along with observations. Evidence from the hotel's *Green Directory*, daily and monthly energy records, presentations on energy conservation and online resources were used as secondary data. In the process of data collection, steps were taken to ensure data validity and reliability.

Findings – The study identified that energy conservation practices, physical and monetary energy management accounting practices and performance measures of the hotel have been institutionalized and have evolved gradually over time. The contribution of accounting and finance towards the advancement of these practices is still limited and the potential for further development is significant.

Research limitations/implications –Due to limited access to confidential internal energy records, the researchers' interpretations were brought in, to illustrate and justify certain points. Further, as a result of the context-specific nature of the study, the findings are difficult to generalize across industries and are best suited for hotels with similar characteristics.

Originality/value –The study attempts to fill the dearth of research related to energy management and its accounting implications in the hotel industry in a developing country's context. The findings will be particularly useful for hotels with similar characteristics when adopting and developing a sustainable energy management system in collaboration with the finance function.

Keywords- Energy conservation, Environmental Management Accounting, sustainable management, hotel industry, Sri Lanka.

Paper type- Case Study

* Corresponding Author: E-mail: ruth.jayasinghe@yahoo.com

1. Introduction

Hotels, in general, form a retreat far away from the cares of everyday life. They are designed to provide multi-facetted comfort and services to guests. Many of the services provided to hotel guests are highly resource intensive. As a consequence, hotels, of all commercial buildings, have been found to have the highest negative impact on the environment (Rada, 1996). This knowledge, coupled with increasing concern about the natural environment and soaring energy prices, provoked the need for sustainable utilization of energy in the hotel sector. This, among many other reasons, led to the development of Sustainable Tourism, which continuously evolves with developments of mechanisms such as Environmental Management Systems (EMS). As appraised by Chan (2008), EMS is a way for management to deal with aspects that impact on the environment.

Amongst numerous fields in which EMS could be implemented, Energy and Power is considered to be conspicuous as it accounts for a significant proportion of operating costs of most business cases. In a hotel scenario energy is required for multiple sources facilitating multiple operational activities that comprise the routines of a hotel. As Maleviti *et. al.* (2011) states, hotels require various types of energy sources to operate, such as electricity, oil, liquefied petroleum gas (LPG) and natural gas. According to Maleviti *et. al* electricity is the primary energy source used in hotel facilities and is used for air-conditioning, lighting, laundry, dryers and other miscellaneous equipment used in kitchen facilities.

Therefore, it is understood that there is a high potential for preserving energy as it will be a cost saving while facilitating better environmental management. A balance between business operations and environmentally friendly initiatives should always be maintained, since poorly-implemented strategies could result in unanticipated results. As discovered by Brown, (1996) cost benefits can be achieved by operating a more "environmentally friendly" hotel. However, anecdotal evidence would suggest that of more concern to the hotelier is the impact of environmental initiatives on the perceived quality and service of the hotel.

In the Sri Lankan context, energy conservation initiatives, their applicability and success could be different to the worldwide norms. Likewise, the factors that have driven Sri Lankan companies towards such initiatives could be different. As Hunter and Wassenhove, (2011) pointed out; before seeing the firm's initiatives in detail, it will be useful to consider the Sri Lankan context at a time of post-civil war, and understand how the company's history, management organization and values faced new social pressures that threatened margins and profits in its key business units. However, despite its importance, there is a clear dearth of research in this area (Gunarathne and Lee, 2013).

Thus, a gap is identified to study energy conservation practices carried out in the Sri Lankan hotel industry. In a bid to bridge this gap, the study aims to examine the adoption and current status of energy related practices in a leading hotel in Sri Lanka and its physical and monetary accounting implications on such practices. It also strives to evaluate the performance of such measures and recognize possibility for further improvement.

The hotel that is selected in the study belongs to a well-known group of hotels based in the popular resort town of Negambo, in the West Coast of Sri Lanka. Envisioned with the hope for a greener future and sustainable tourism, the leadership of the hotel is focused and driven towards sustainable development of the hotel chain. Being a preferred tourist destination for most of the nature lovers who visit Sri Lanka, the hotel has earned a prestigious name for its best environmental management practices.

It comprises of 82 Deluxe Rooms, 21 Super Deluxe Rooms and 3 family rooms as well as 6 Sumptuous Suites. Enriched with an environment-friendly culture, the hotel has developed its position as a leading green hotel in Sri Lanka, growing and stabilizing its competitive advantage in tourism industry. From the many green initiatives adopted by the company, in this study the focus has been given towards energy preservation.

The rest of the paper is organized as follows: the next section provides the literature review. Section Three presents the methodology of the study. The Section Four presents the findings and the discussion. The last section concludes.

2. Literature Review

A growing interest towards sustainable business practices is observable in recent years. Various predictions on global warming and the massive media attention given to the matter have driven concern towards more environmentally prudent corporate activities. The Brundtland Report (World Commission on Environment and Development, 1987) provides perhaps the most widely recognized definition of sustainable development as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. While the concern for sustainable business practices is growing in many industries, the tourism sector shows above-average enthusiasm in adopting such practices.

In the field of tourism and hotel management, environmental concerns are given significant importance. As Hsieh (2012) pointed out, the hotel industry, as a significant sector of the tourism industry, also plays a major role in contributing to environmental sustainability. For example, the operations of a hotel require water,

heating, cooling, lighting, a laundry system, and appliances, all of which have a significant impact on the environment. On the other hand, hotels, especially resort hotels, rely upon the natural environment to attract tourists and to increase their profits. Under these circumstances, the need for sustainable business models, and in connection, Environmental Management Systems, have emerged in the hotel sector. Caraiani *et al*. (2005) defined Environmental Management System (EMS) as a structured approach to addressing the environmental bottom line. An EMS provides a solid framework for meeting environmental challenges and realizing the above benefits. Environmental Management Accounting (EMA) is one such mechanism that facilitates effective EMS within an organization.

In this study, the adoption of Environmental Management Accounting Practices (EMA) in the hotel sector is specifically looked at. Gunarathne and Lee (2013) found that there is a dire need for tourist organizations to follow EMA to face mounting pressure to be environmentally conscious. This requires a systematic adoption of EMA. As discussed by Letmathe and Doost (2000) an environmental cost accounting system is a flow-oriented cost accounting system which is based on a systematic cause-and-effect analysis. Especially output-related costs, such as emissions, waste disposal and waste water are assigned correctly to the inputs which cause them. Further they argued that it helps to identify and minimize environmental impacts and their costs.

Stipanuk, (1996) identified that one way to manage the environment effectively is preservation of energy. Wilco and Ho as cited in Stipanuk (1996), stated that many efforts on environmental protection work in hotels in the 1990s were a contribution of some long-standing environmental concerns such as energy conservation. Maleviti *et al*. (2011) found that due to their multiple operations, hotels, consume high amounts of electricity and oil, in the absence of renewable energy technologies and energy efficiency methods. Hence, it is important to examine and evaluate possibilities that would reduce energy consumption in hotels, evaluating also the effectiveness of energy measures.

Adoption of Energy Management systems within an organization will reward an organization in numerous ways. In the eyes of a customer there is a growing concern for the "green hotel concept". Chan and Ho (2006) claimed that 75 percent of interviewed customers claimed that they were environmentally-minded consumers and would choose hotels which showed concern for the environment. Further they stated that the most significant benefit of environmental management was the improvement in public image and better relationships with the local community. Moreover Hsieh (2012) found that governments can also learn about a firm's commitment to environmental practices. He stated that an environmentally friendly hotel can gain a competitive advantage and otherwise benefit from

reducing costs, cultivating a positive image, increasing employee loyalty, and retaining customers. However, Chan and Ho (2006) argued that many hoteliers with written environmental policies saw the greatest benefit in financial management performance.

Maleviti *et al*. (2011) observed different practices undertaken at two hotel facilities in Greece, with the intention of preserving energy. These practices range from using energy efficient bulbs to renewable energy generation. They also identified various other energy conserving practices such as thermal insulation, renewable energy technologies installation, information for rational use of energy etc.

Xu, Chan and Qian (2012) suggested several energy related KPIs providing guidance on the aspects that should be considered in an energy management system; quality performance, hotel energy management, cost performance, energy consumption & resources saving, innovation and simple rules improvement. In the journey of reaching these KPI targets, they proposed such as improve environment and reduce CO_2 emission; stop losing money on utility bills and reduce maintenance cost.

The various energy management initiatives implemented worldwide, and its applicability in the given scenario is controversial. Only a systematic adoption of Energy Management will bring the expected results and ensure the success of the practices implemented. Thus there is a need to identify and evaluate how the selected hotel company has adopted its energy practices over time, the challenges they have come across and the areas that are open for further improvement.

3. Methodology

This section describes the, the nature of the study that determined the method and how the data was collected and analyzed. The case study method was followed as the research question was based on a contemporary real life phenomenon (Yin, 2009); i.e., how the hotel has adopted energy conservation and green practices in its operations.

Three interviews were carried out in order to gain an understanding of the energy conservation initiatives of the hotel. The interviews were unstructured in nature. Prior to conducting the visits, the hotel's official web site was explored. Also, other web sites and documents relevant to the subject area were referred to, which enabled an understanding on global energy conservation practices and benchmark standards. Conducting interviews was a mean of triangulation which ensured the reliability of data collected by the secondary sources. According to Chan (2008) while the interviews were carried out, the environmental measures being documented in the prototype check list were cross-checked and confirmed by hotel

staff including the quality assurance manager, chief engineers, department managers, chief steward, and members of the hotel's green committee. A summary of information obtained from above mentioned interviews are included in Appendix 01 and Appendix 02.

In addition to interviews, the researchers also visited the hotel's power plants, water treatment plants, solar power panels, the bio mass boiler, the garden, guest rooms, stores, laundry, etc. Observations made were matched with the descriptions and explanations given in interviews. Observation facilitated further clarification, helping to avoid bias statements.

As a secondary data collection method, document review and referencing archival records were used. In his study Chan (2008) stated that the reviewed documentation encompassed environmental management manuals, periodic reports, trade journals, CD-ROMs, training materials, energy consumption data sheets, energy-saving facilities' catalogues, energy audit reports, energy conservation reports, and proposals for research findings. Similarly, hotel's internal energy records, reports presented at the meetings, power point presentations designed for staff training on energy conservation, journals and paper articles published on hotel's green practices were referred in this study. Furthermore, a special document published by the hotel named the Green Directory was referred to.

Multiple sources of evidence including documentation, interviews and physical artifacts were used. For the purpose of observation and gathering of physical artifacts two field visits were conducted. Chan (2008) claimed that observation through field visits and physical artifacts enhanced the validity of the information collected. The study used interviews and physical artifacts as double verification devices to ensure the validity of internal data. The collected data we analyzed using the explanation building approach of Yin (2009). The next section presents the findings and the discussion of the study based on the analysis.

4. Findings and Discussion

In building up the case narrative, the factors which inspired the hotel to adopt energy conservation practices, how these practices were initiated and the challenges met during the process were identified.

Drivers for adoption of energy management (EM)

The drivers that propelled the hotel to adopt energy management practices can be mainly categorized into two, namely, market/external drivers and internal drivers.

The main external driver for the adoption of green initiatives came as a bid to save cost during a civil war period. Inspired by a vision for a greener future, the hotel commenced its operations in the late 90s, nestled in the popular resort town of Negombo, in the Western coast of Sri Lanka. From its inception the hotel had its vision towards eco-friendly initiatives. However, the country endured a political and economic unstable situation during the period of the civil war and the tsunami, which caused a major decline in the Sri Lankan tourism industry. Hence the management focus on the environment amplified, with the aim of surviving in the industry. That is, with the declining revenues, the hotel had to seek ways of minimizing operating costs. Amongst numerous means of curtailing costs such as lay-off, the hotel identified eco-friendly initiatives would allow the hotel to directly increase profits without increasing revenue. As such, the hotel initiated various strategies of environmental preservation. Among these environment preservation practices, energy preservation is given a prominent place. Money saved on energy was passed on straight to the bottom line which enabled the hotel to survive despite sluggish industry growth and macroeconomic challenges.

Another external pressure came up with escalating energy costs. Hotels utilize significant amounts of energy for daily operations and recreational activities. To intensify the situation, energy prices have been rapidly increasing in the recent years and are expected to continue in the future. As explained by Gee (1999) modest capital expenditure and good housekeeping can result in 20-30% savings on energy bills. If a similar increase in profits were to be achieved by more conventional means, such as increased sales, the turnover would need to increase by around 12-15% (Gee, 1999). Therefore, in order to grow and remain competitive in the industry, the hotel made significant investments in efficient energy consumption, which has led to substantial reductions in energy costs and other operating costs. For an instance, the impact of the recent electricity price hike announced during April 2013 has been minimize due to the energy conservation practices which have enabled the hotel to enjoy competitive advantages over its competitors.

Another external factor which drives EM practices in the hotel is its focus towards continuous excellence. The hotel has already obtained ISO 14001 for Environmental Management, and at present has launched several initiatives targeting ISO 50001 specified for Energy Management Systems (EMS). In order to comply with the requirements demanded by the standard ISO 50001 the hotel has re-engineered most of its processes and restructured its systems related to energy consumption. Furthermore, the hotel ensures continuous adherence to the developments and upgrades of the standard's requirements whilst seeking to obtain new standards in line with the hotel's focus on continuous excellence. As discussed earlier, the Sri Lankan tourism industry endured a sluggish period

during which tourists were reluctant to visit due to political instability which prevailed in the country. Hence, in order to recover from the slow-moving growth, Sri Lankan hotels were determined to outclass the regional tourist destinations. As such, international standard certifications brought in value and corporate image to the hotel which provided them a competitive advantage in attracting tourists as a more eco-friendly vacation choice, as demanded by many tourists in the current context.

Further, the hotel is envisioned to be a corporate citizen by ensuring its active compliance with ethical standards. Being energy efficient can enhance business's reputation and encourage a positive impression on consumers, employees, communities, stakeholders and all other members of the public sphere. Reduced utilization of energy could be viewed as a curtailed demand for electricity from the national grid. For instance, the hotel obtains power from the immediate transformer which allows a maximum capacity of 1000KV. But they do not intend to use the maximum capacity, enabling the neighboring community to utilize adequate capacity of power, which in turn ensures a good relationship with neighboring community.

In addition to these external forces, certain internal factors too have driven EM practices. Among them, the chairman's commitment for environmental well-being is important. The chairman himself is an inspiration for the sustainable vision of the hotel. The guidance of the chairman together with the leadership of the top management, has resulted the growth of EM becoming more than part of the job description. EM practices have developed by to the extent that it has been engraved in the culture of the hotel with total involvement of staff from all levels.

Implementation of energy conservation initiatives

Driven by the external and internal drivers the hotel implements many energy conservative activities. These activities will be discussed under ventilation and air conditioning, lighting and catering.

Important EM activities have been adopted under ventilation and air conditioning operations. An analysis of energy consumption has indicated that the hotel's electricity consumption is mainly due to air conditioning. The air conditioning machines consume 53% of total electricity usage of the hotel. Hence the hotel has implemented numerous strategies to minimize the electricity costs incurred. These strategies include, but are not limited to:

i. Improvements made in the air conditioning system, where the conventional air conditioning process has been replaced with a "Chilled Water System", which has enabled the hotel to curtail air conditioning cost significantly.

ii. Deployment of "Intelligent Thermostats" connected to a room motion sensor which detects the room occupancy and activates an "occupied temperature" or an "unoccupied temperature". The occupied temperature would be activated with the sense of occupancy i.e. the temperature preferred by the guest. When the room is unoccupied, the unoccupied temperature would be activated which the suitable humidity and air quality set by the property management. Though the resulting reduction in energy consumption using such a system is not immediate, it is significant.
iii. Draping of wooden blinds in guest rooms in order to preserve the cool atmosphere in the room which would lessen the need of high air-conditioning. The curtains and blinds are closed at the end of the day to reduce heat in rooms when receiving the early evening direct sunlight.
iv. Allowing Maximum natural ventilation in rooms to further lessen the need of high air-conditioning and ensuring windows and external doors are closed as much as possible when air-conditioning is on and encouraging guests to do the same.

Other important EM initiatives can be observed under lighting aspects. Lighting is a fundamental element of the hotel and its expense has always been accepted as inevitable. Effective and attractive lighting is essential for customer comfort and satisfaction as well as for the health and safety of staff and visitors. Yet by implementing the following lighting controls and efficient luminaries, the hotel has been able to curtail lighting energy costs.

i. Upgrading 90% of standard light bulbs to LEDs, which use up to 80% less energy and provides approximately 50,000 hours of use.
ii. Installation of occupancy sensors which help to ensure lights only operate when there is occupancy to require them. Especially useful in storerooms, offices, washrooms, corridors, and back of house areas. These occupancy sensors have enabled the hotel to maintain minimum light levels so as not to compromise health and safety.
iii. Promotion of 'Switch off' policy on lighting, so that only lighting that is being used, is left on. The hotel raises staff awareness by placing stickers above light switches and posters in staff areas (available from the Carbon Trust). Lights in unoccupied areas are switched off, without compromising health and safety implications particularly in corridors and stairwells. As part of the policy, light switches have been labeled by color code system and card-key system which guides the user to select only those lights required and the time frame which they should be switched on.

Catering aspects have also been subjected to EM initiatives. The hotel has identified the kitchen as a critical energy consuming unit which accounts for a noticeable

portion of the hotel's total energy consumption. The following initiatives have been implemented to address this issue.

i. Meter systems fixed in the freezer doors, which captures and records the number of times and the duration of the freezers opened and closed. To minimize the number of times the freezer door being opened, the hotel has formed a freezer door opening schedule and had reduced the wastage of electricity.
ii. Continuous training sessions for the kitchen staff in order to raise awareness on efficient energy consumption for kitchen appliances that consume significant amount of electricity. E.g. Equipment labeling with minimum warm up times, usage of correctly sized equipment and switch off unnecessary kitchen equipment and lights etc. These useful practices accumulate to a significant amount of saving which contributes to a substantial power saving and minimized expenditure.

In addition to the abovementioned aspects, the hotel uses alternative energy sources such as solar power, wind power and bio-gas. The hotel is equipped with 36 solar panels which generate approximately 20kw per day. The power generated by the solar panels is used for guest room lighting and boiling water, where nearly 15,000 liters of water is boiled per day using the same. Furthermore, the hotel utilizes power generated by the chiller for the air conditioning plants which is measured to be 9120kwh per month whereas the total saving is measured to be Rs.134, 396 per month. The accounting aspects here represent monetary as well as physical EMA as suggested by Burritt *el al.* (2002). The hotel's solar power generation is measured on daily basis and is continuously monitored by the Chief Engineer.

During 2011, the hotel initiated electricity generation through wind power turbines equipped with 2 wind turbines and generated electricity that was sufficient to fulfill the lighting requirement of the garden. However, due to maintenance issues, the wind turbines were removed in 2012. The hotel commenced a Sewerage Treatment Plant (STP) in 1996 which was further improved subsequently by the addition a Bio-gas production unit. Currently the cookery functions in the staff canteen are entirely powered by the Bio-gas produced in the STP.

Owing to various energy conservation practices, the hotel has been able to reduce its energy cost. Furthermore, it has been able to reduce its Carbon Footprint (CF) by 22% in 2012 compared to the corresponding previous year. The hotel is further concerned about reduction of carbon foot print and is seeking ways of neutralizing the impact as opposed to minimizing it. The implementation of these EM actions

was not without many challenges. The next section explains those challenges faced by the hotel.

Challenges faced in implementing energy conservation initiatives

Many challenges were, and still are, encountered by the hotel in implementing the EM actions mentioned in the previous section. They include structural limitations, investment requirements and recurring costs, continuous training requirements for the staff and attitudes of the guests among others.

Structural constraints of a building have been a major challenge in adopting many EM strategies. The design of a building will be a critical determinant of the energy consumption of that property. Xu *et. al.* (2012) observed this as;

> *"The hotel building is one type of large-scale public/commercial building and in general with high energy consumption, with a large potential for energy efficiency improvement. In addition, the property ownership of most hotel buildings is single, which comparing with multi-ownership in residential and office building, is easy to deliver Building Energy Efficiency Retrofit (BEER) in this type of buildings."*

The hotel under study commenced its operations in 1976 in an era when the sustainability initiatives were not highly regarded. Therefore the initial architectural design has not given significant consideration to energy conservation and sustainability concepts. The hotel now constantly faces the challenge of inability to change its structure resulting in less potential for cost savings, energy in particular.

Some energy conservation practices require a high level of investment which is another challenge the hotel faced. For instance the hotel has invested a large amount of funds on the Solar Panels and energy saving ovens used in the kitchens. Additionally, a hotel which follows green practices has to spend on recurring costs associated with such practices apart from their daily operational costs. These include costs associated with ongoing staff training, environment equipment replacement, maintenance, upgrading, periodic environmental auditing and third-party certification and so forth (Chan and Ho, 2006). Though, the hotel as a good corporate citizen has the genuine requirement to adopt sustainability practices, it faces difficulties in allocating necessary funds required for capital investment and subsequent recurring costs for these environmentally friendly initiatives.

With regard to energy conservation, the major involvement and contribution should be from the employees. To maintain continuous involvement regular training and staff awareness has to be provided, which is a major challenge faced

by the management. As Chan and Ho (2006) pointed out; in the late 1990s, a survey conducted by the United Nations and the International Hotel Association identified a lack of training resource as the major concern when introducing environmental matters to the hotel management curricula. For example, energy saving handling methods of some kitchen appliances may require additional effort of the kitchen staff and sometimes they may have a trade-off between ease of use and responsible energy consumption. This certainly requires an attitude change of the staff in order to successfully implement the practices.

Each and every guest who visits the hotel is not environmentally prudent. While some have high regards towards "green power", there are some visitors who show no interest towards such practices. Rowlands *et al*. (2002) argued that the presence of a pro-environment attitude does not necessarily lead to pro-environment action. As such it was evident that the environmental-friendly culture of the hotel has not lured the guests to be environmentally concerned. To overcome this, the staff first need to determine public perceptions of the environmental impact (of different energy sources) so that their perceptions can be shifted by means of, for example, public education and/or marketing campaigns (Rowlands *et al*., 2002). Likewise, the hotel has launched various public and guest awareness programs to educate them on how they could contribute to a more eco-friendly stay. Nonetheless, the extent to which they respond to those suggestions remains questionable.

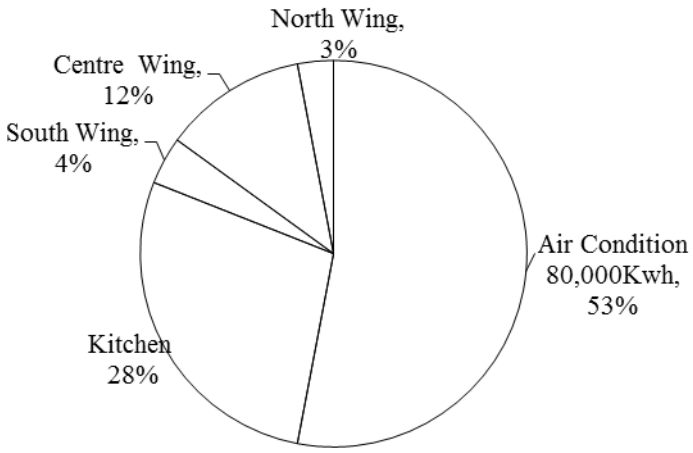
Physical and monetary accounting practices

As mentioned in the previous section the engineering and maintenance department of the hotel is responsible for planning, implementing, controlling and reporting energy conservation and green practices. The hotel employs a Naturalist for planning and advisory aspects of green practices. However, despite the presence of the accounting department, the engineering and maintenance department headed by the Chief Engineer takes initiative in reporting aspect of energy and green practices due to technical expertise required.

The staff of the engineering and maintenance department takes the responsibility in keeping records of daily and monthly consumption of water, electricity, gas and solar power in order to analyze the consumption pattern and the variances with causes. As such, the total energy consumption of the hotel is measured on daily and a monthly basis at each activity and department levels through meter readings relevant to the energy sources available and is continuously monitored by the Chief Engineer. The results and variances of the data collected are discussed and analyzed during the engineering meetings.

The hotel obtains the meter readings relevant to many energy sources. They are electricity from the main grid (departmental meter readings), electricity generated by solar power, electricity generated by wind power and other sources such as LP-Gas and bio-gas generated from the plant. As per the latest figures available as of December 2012, the total electricity consumption consists of followings (refer Figure 01).

Figure 01: Components of energy consumption



Source: Based on the Chief Engineer's records

As depicted in the above diagram it was evident that the highest level of energy is consumed to the air-conditioning operations (53%), which is common in the hotel industry. As mentioned earlier, total energy consumption of the hotel is measured, and the results and variances of the data collected are discussed and analyzed during the engineers' meetings. Subsequent to discussion on the energy consumption rates, the total amount of carbon emission is calculated and ultimately the total carbon footprint is calculated based on activities. Due to the practical difficulties, the involvement of the accounting department for the accounting aspect of energy practices is comparatively limited. However, the cost incurred for energy conservation projects are recorded by the accounting department and it is the responsibility of the engineering and maintenance department to ensure the effectiveness of the projects.

5. Conclusions

The paper demonstrates how a hotel in Sri Lanka initiated energy conversation practices and how they were implemented. It further highlights how external and internal drivers institutionalized the environmental initiatives and how those

environmentally oriented actions are sustained in the hotel sector organization. These environmental actions have been grown and developed outside the purview of accountants. In the future this calls for greater involvement of accountants in the area of environmental sustainability. However, the findings of this study will be more suited to hotel sector organizations since they posses some special characteristics. Further, findings of this study could be confined to some context specific conditions prevailed in the hotel or the hotel group. Thus, more future research is needed in the hotel sector covering hotels that represent different sizes, star gratings, locations.

The implementation of these strategies faces many challenges which in turn reduce their effectiveness. In order to overcome these challenges and to get the full potential the hotel can take actions from different fronts. Among them, obtaining volunteer customer involvement is important.

Guest rooms in a hotel account for a major part of the total area of hotels, depending on the type of facility (Lawson, 2001), and are in general characterized by energy consumption profiles difficult to predict. Guests are frequently given full control over indoor thermostat settings, individual air conditioning units, as well as operable windows and doors, and these are typically used with little or no concern for energy conservation. Therefore, in order to reap out the benefits of EMS, voluntary customer involvement is a necessity. As practiced by the Belgian Hotel group “Martin’s Hotels” (Martin’s Hotels, 2013), customer participation can be obtained to reduce the ecological footprint by suggesting useful practices for the guests under no obligation, yet with rewards. As described in the hotel website of Martin’s Hotels group, the guests are presented an "Eco Voucher" card at reception which would include several suggestions to be practice during their stay, adherence to which guests will earn points. The points can be accumulated every time the guests stay at one of the hotels, and which can be exchanged for may be products or extra facilities or discounts on services. The hotel can take initiative in using a similar project which would accumulate to greater savings by reducing the CO_2 emissions associated with water and electricity consumption.

Furthermore, the hotel could resume the wind turbine project which has been closed down in 2012 due to maintenance issues. Being benefited by the continuous wind power based in the coastal area, resuming this project will enable the hotel to achieve significant reductions in energy costs with soaring energy costs in the current context. In addition the hotel could use solar garden lamps for garden lightening so that dependence on the national grid can be reduced. Further to above, in the long run the hotel could investigate in utilization of tidal power as it is the more predictable than wind energy and solar power. The hotel being the first to implement an STP plant, equipped with the technology, knowledge and man power

this area. Being nested in the coastal area, the hotel will be of great advantage by the use of this renewable energy source. Electricity consumption could be further reduced by upgrading 100% of its lightening to LED. Currently the hotel has upgraded only 90% of its lightening to LED, whereas higher energy savings can be achieved through converting the remaining 10% of lightening as well. Despite 10% being a small portion of the total area, these could be bulbs which are switched on for a prolonged period of time. In addition to the above mentioned energy saving alternatives, it is recommended that the hotel involves 3rd party in the CF calculation in order to verify and assure the figures rather than internal control.

References

Brown, M. (1996), Environmental policy in the hotel sector: "green" strategy or stratagem?, *International Journal of Contemporary Hospitality Management,* Vol. 08 No.03, pp.18-23.

Burritt, R., Hahn, T. and Schaltegger, S. (2002), Towards a comprehensive framework for environmental management accounting: links between business actors and environmental management accounting tools, *Australian Accounting Review,* Vol. 12 No. 2, pp. 39–50.

Caraiani, C., Lungu, C. I. and Dascalu, C. (2005), *Green Accounting - a Helping Instrument in European Harmonisation of Environmental Standards,* Academy of Economic Studies of Bucharest, Bucharest.

Chan, W. W. (2009), Environmental measures for hotels' environmental management systems ISO 14001, *International Journal of Contemporary Hospitality Management,* Vol.12 No. 05, pp. 542-560.

Chan, W. W. and Ho, K. (2006), Hotel's environmental management systems (ISO 14001): Creative financing strategy, *International Journal of Contemporary Hospitality Management,* Vol.18 No.04, pp. 302-316.

Department of Climate Change. (2009), *National Greenhouse and Energy Reporting System Measurement: Technical Guidelines*, Department of Climate Change, Canberra.

Gee, D.A. (1999),"Facilities Management and Design", In Verginis, C. S. and Wood, R. C. (Ed.). *Accommodation Management: Perspectives for the International Hotel Industry,* Tourism and Hospitality Management Series, International Thomson Business, London.

Gunarathne, N. and Lee, K. (2013), Adopting and Implementing Environmental Management Accounting (EMA) Practices in the Hotel Sector: A Sri Lankan Case, A paper presented at the EMAN Global Conference, Gold Coast, Queensland.

Hseih, Y. (2012), Hotel Companies' environmental policies and practices: a content analysis of their web pages, *International Journal of Contemporary Hospitality Management,* Vol.24 No.01, pp.97-121.

Hunter, M. L. and Wassenhove, L. N. V. (2011), Hayleys PLC: corporate responsibility as stakeholder relations, *Journal of Management Development*, Vol.30 No.10, pp.968-984.

IPCCWGI – Fourth Assessment Report (2007), "Summary for policymakers", In Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M. and Miller, H.L. (Ed.). *Climate Change 2007: The Physical Science Basis,* Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, pp. 1-21.

Johnston, R. J. and Tyrrell T. J. (2007), Management exercises and trainer's note in sustainable tourism and dynamics, *International Journal of Culture, Tourism and Hospitality Research,* Vol.01 No.04, pp. 328-337.

Lawson, F. R. (2001), *Hotels and Resorts – Planning, Design and Refurbishment*, Architectural Press, UK.

Letmathe, P. and Doost R. K. (2000), Environmental cost accounting and auditing, *Managerial Auditing Journal,* Vol.15 No.08, pp.424-430.

Maleviti, E., Mulugetta, Y. and Wehrmeyer, W. (2012), Energy Consumption and attitudes for the promotion of sustainability in buildings, *International Journal of Energy Sector Management*, Vol.06 No.02, pp. 213-227.

Martin's Hotels. (2013), Tomorrow needs today, retrieved on 31.08.2013 via http://www.martins-hotels.com/en/configurator/index/tomorrow-needs-today-ecobons.

Rada. J. (1996), Designing and building eco-efficient hotels, *Green Hotelier Magazine,* Vol. 4, pp.10-11.

Rowlands, I. H., Parker, P. and Scott, D. (2002), Consumer perceptions of green power, *Journal of Consumer Marketing,* Vol.19 No.02, pp.112-129.

Stipanuk, D. M. (1996), The US lodging industry and the environment: an historical view, *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 37 No. 5, pp. 39-45.

World Commission on Environment and Development (1987), *Our Common Future*, Oxford University Press, Oxford.

Xu, P., Chan, E. H. W. and Qian, Q. K. (2012), Key performance indicators (KPI) for the sustainability of building energy efficiency retrofit (BEER) in hotel building China, *Facilities*, Vol.30 No. 9/10, pp. 432-448.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

Appendix 01

Outline of the interview carried out to obtain background information of energy conservation practices and the cultural influences.

Interviewee	Points noted
General Manager	▪ The hotel endures a culture of doing business in a way that minimizes the negative externalities. ▪ The hotel with the help of a German scientist in 1996 carried out an experiment to discover the first ever STP (Sewerage Treatment Plant) in Sri Lanka. Even though the main focus of the project was initially not energy conservation, later the STP was linked to a bio-gas plant. ▪ The explicitly identifiable energy conservation practices commenced implementation during the year 2001. ▪ With the rise of the eco-tourism post 2005, the hotel obtained various standards and practices to gain the market edge.
Naturalist	▪ The hotel's aptitude towards sustainability is revealed through employing a naturalist. ▪ Naturalist is responsible for recommendation of initiatives to reduce carbon emission. However, due to the complexity of the calculations and the technical expertise associated with energy conservation, greater responsibility lies with the Engineering and Maintenance Department.

Appendix 02

Outline of the interviews carried out to obtain data on the technical background of energy conservation practices.

Interviewee	Points noted
Chief Engineer	▪ Carries out the tasks of controlling and monitoring of energy conservation initiatives. ▪ Reports procedures and gathers meetings ▪ Conducts awareness and training programs to staff members

Department of Accounting
Faculty of Management Studies and Commerce
University of Sri Jayewardenepura
Sri Lanka

www.projects.sjp.ac.lk/accounting

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