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

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### 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

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## **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 adopt 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 winning 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 (Burrirt *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 (Burrirt *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; Burrirt *et al.*, 2002).

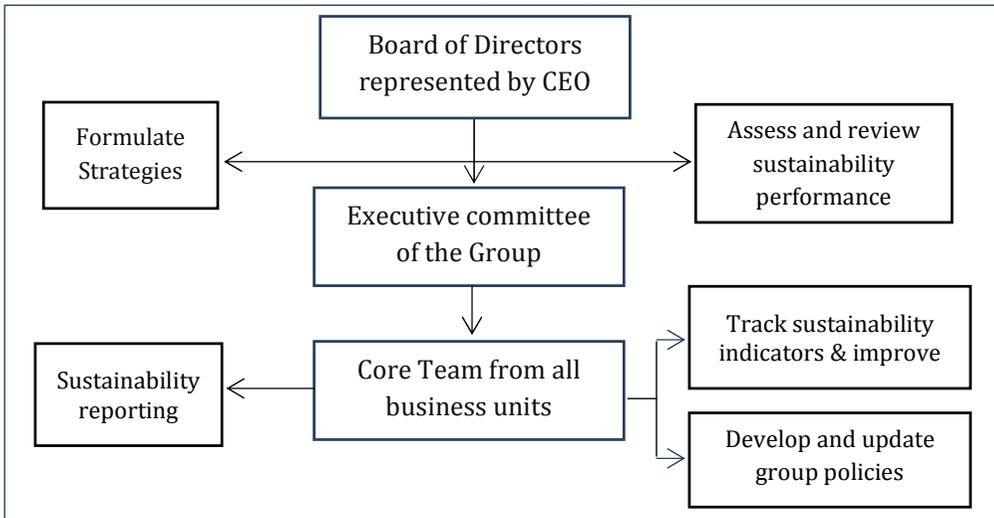
Further, the company’s ERP system calculates the average waste expected based on the previous production. Extra material is decided based on this average waste rate. Thereafter it is the duty of the factory manager to make sure that they do not exceed this waste. If there have been five continuous instances 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.

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## **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?