

Environmental Management Accounting (EMA): Empirical Evidence from the UK Manufacturing Sector

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Background: Evolution of EMA

- In 1990, first CIMA-sponsored research on the environment is published:
 - *‘The Costs to Industry of Adopting Environmentally Friendly Practices’*
- In 1990, first article in Management Accounting (now *Financial Management*) on accounting and the environment
 - *‘Management Accounting for a Cleaner world’*
- In 1997, first CIMA-sponsored publication on environmental management and accounting:
 - *‘Environmental Management: The Role of the Management Accountant’*

Background: Re-engineering of EMA?

- Thus, it appears that EMA debate is reaching its 20th anniversary
- But:
 - In 1974 the ‘Watt Committee on Energy’ was formed, incorporating members of the Institute of Cost and Management Accountants (ICMA)
 - In 1979, Watt Committee Report No. 6 ‘*Evaluation of Energy Use*’ published that described the process of energy accounting and energy audit
 - Between 1977-1984, *Management Accounting (UK)* included articles on how to account for, and manage, energy use in manufacturing and buildings

EMA = 'Efficient' Management Accounting?

- Elements of EMA should already be present within traditional management accounting practice
- A quote from *Management Accounting* in 1980:
 - “Energy has been often treated as having a trivial cost compared to other expense items. It has become important and is forecast to become more important. If accountants are unable to report on it, and their systems do not control energy costs, they are likely to be neglecting an aspect of business which is constantly increasing in cost and therefore importance” (Claret, J, 1980)
- Even more relevant today, with the Carbon Reduction Commitment (CRC) etc.

How is EMA Defined?

- When looking for evidence of EMA, what should I look for?

Author	Definition of EMA
International Federation of Accountants (IFAC, 1998)	{EMA is] the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. Whilst this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full cost accounting, benefits assessment, and strategic planning for environmental management.
UNSD EMA Initiative (2002)	EMA serves as a mechanism to identify and measure the full spectrum of <i>environmental</i> costs of current production processes and the economic benefits of pollution prevention or cleaner processes, and to integrate these costs and benefits into day-to-day business decision making
Bennett and James (1998)	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

- Alternative (but consistent) terminology:
 - Eco-Management Accounting (ECOMA)
 - Green Management Accounting
 - Environment-related Management Accounting

What is EMA?

		ENVIRONMENTAL MANAGEMENT ACCOUNTING (EMA)			
		Monetary Environmental Management Accounting (MEMA)		Physical Environmental Management Accounting (MEMA)	
		Short-term focus	Long-term focus	Short-term focus	Long-term focus
Past orientated	Routinely generated	Environmental cost accounting (e.g. variable costing, absorption costing and activity based costing)	Environmentally induced capital expenditure and revenues	Material and energy flow accounting (short term impacts on the environment – product, site, division and company levels)	Environmental (or natural) capital impact accounting
	Ad hoc information	Ex-post assessment of relevant environmental costing decisions	Environmental life cycle (and target) costing Post-investment assessment of individual projects	Ex-post assessment of short-term environmental impacts (e.g. of a site or product)	Life cycle inventories Post-investment assessment of physical environmental investment appraisal
Future orientated	Routinely generated	Monetary environmental operational budgeting (flows) Monetary environmental capital budgeting (stocks)	Environmental long term financial planning	Physical environmental budgeting (flows and stocks) (e.g. material and energy flow activity based budgeting)	Long-term physical environmental planning
	Ad hoc information	Relevant environmental costing (e.g. special orders, product mix with capacity constraint)	Monetary environmental project investment appraisal Environmental life cycle budgeting and target pricing	Relevant environmental impacts (e.g. given short run constraints on activities)	Physical environmental investment appraisal Life cycle analysis of specific project

Comprehensive Framework for Environmental Management Accounting (Source: Burritt *et al* (2002))

What are the Costs that EMA Manages?

- What might I have expected to be seen as “environmental” costs and benefits; one influential framework comes from US EPA (1995):

‘Tiers’ of Environmental Cost		
Conventional Costs (Tier 0)		
Capital costs	Materials and energy	Labour
Supplies	Utilities and Structures	Salvage values
Potentially Hidden Costs (Tier 1)		
Regulatory	Upfront	Voluntary (beyond compliance)
Notification & Reporting	Site studies and EMS	Implementation of EMS
Pollution control	Site preparation	Monitoring/testing & reporting
Inspections & Monitoring	Permitting	Planning, training & audit
Modelling & Training	R&D	Qualifying suppliers
Remediation	Engineering and procurement	R&D
Planning & Record Keeping	Installation	Insurance
Waste & emissions management		Feasibility studies
Taxes, Fees & Penalties	Back End	Remediation
Manifesting & Labelling	Closure/decommissioning	Recycling
Preparedness	Disposal of inventory	Environmental studies
Protective Equipment	Post-closure	Community relations
Environmental insurance	Site survey	‘Green’ projects in society
Response to incidents		
Contingent Costs (Tier 2)		
Future compliance costs	Property damage	Natural resource damages
Penalties/Fines/Remediation	Personnel injury damage	Legal Expenses
Response to future releases		Economic loss damages
Image and Relationship costs (Tier 3)		
Corporate image	Relationship with insurers	Relationship with:
Relationship with investors	Relationship with suppliers	lenders, communities
Relationship with customers	Relationship with professional staff	& regulators
	Relationship with workers	
Social Costs (Tier 4)		
Impact on human life	Environmental degradation	Adverse affect on biodiversity

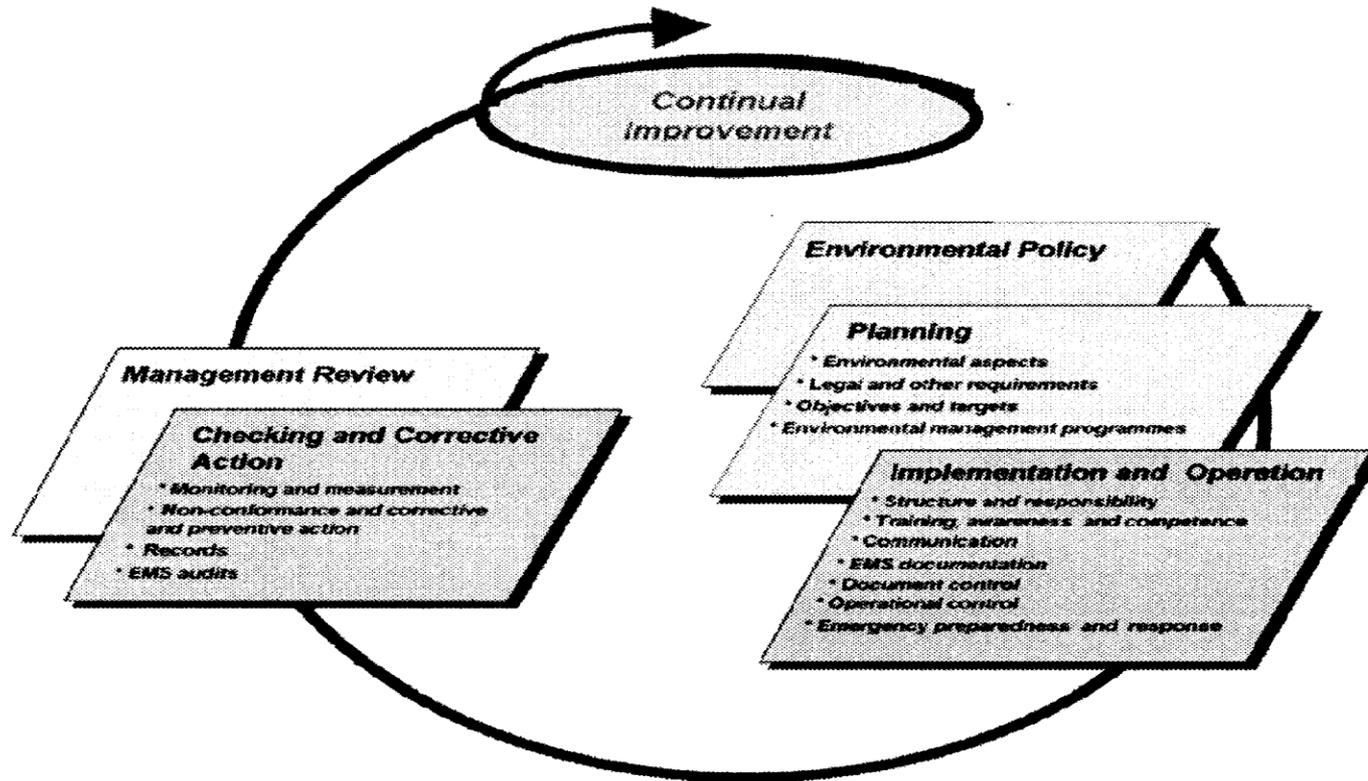
Agenda for Empirical investigation

- Thus, if EMA is necessary for the appropriate measurement and management of environmental costs, such expertise and information should be generated within a manufacturing entity.
- Fundamental research questions:
 - How are manufacturing entities ‘embedding’ environmental issues into operations? Why is it done?
 - What role do management accountants and accounting play in such initiatives?
 - Is EMA information being generated and by whom?
 - Is sustainability development on the agenda?

Empirical Work: The Case Studies

- Manufacturing sites in the UK
 - Copyco (subsidiary of US Copyco Corp, producing and remanufacturing photocopiers, printers etc)
 - Iceco (subsidiary of Unifood PLC, producing ice cream)
 - Paperco (SME paper mill recently taken over by US Paperco Corp)
 - Cobe Laboratories Ltd (Medium sized producer of medical equipment)
- All were members of the same Green Business Club
- Apart from Paperco, each site possessed a certified and accredited environmental management system (EMS) at the start of the research

'Embedding' Environmental Issues: The EMS Approach



- Two alternative voluntary EMS specifications observed:
 - International Organisation for Standardisation's (ISO) ISO 14001
 - European Commission's Eco-Management and Audit Scheme (EMAS), which additionally requires a formal reporting requirement

Essential elements of each site's EMS

- A clearly defined environmental policy
- Identification and evaluation of environmental impacts/aspects (e.g. emissions, disposal of waste and use of energy, raw materials etc)
- Environmental review of site operations
- Assessment of significant environmental impacts
- Operational controls, objectives and targets
- An environmental action programme
- Assignment of environmental responsibilities and documentation of environmental procedures
- Continuous monitoring, audit and evaluation of performance and legal compliance
- Management review

Reasons espoused for implementation of EMS

- “You can’t truly manage something that is inappropriately measured” (EM at Copyco)
- An ISO 14001 EMS seen as an appropriate framework for ensuring legislative compliance and enhancing relations with regulators
- Customers demanded that suppliers possessed an EMS
 - At Copyco, the site had to possess an EMS certified to both ISO 14001 *and* EMAS standards
- Seen as a marketing tool
- ISO 14001 seen as a logical extension of existing ISO 9001 quality management systems
- At Copyco and Iceco, the parent company required implementation of a site-level EMS
- At Paperco, no desire for EMS from parent company



Organisational Development Of EMS

- Professions driving the EMS:
 - Chemical Engineer and Quality Manager (Cobe)
 - Chemist and Quality Manager (Copyco)
 - Engineer (Iceco)
 - Engineer who was also ICAEW qualified (Paperco)
- Functional location:
 - Environmental, Health and Safety unit (Copyco)
 - Safety, Health and Environment Group (Iceco)
 - No specific environmental unit (Paperco & Cobe)

Accounting involvement in the EMS

- Apart from Paperco, the EMS was driven by non-accounting expertise
- Accounting participation in the EMS-related activities required an initial “awareness” of their value:
 - “It's getting them aware, they then come out of their offices and you can get them to help with our projects” (Copyco EM1)
- Day-to-day interactions between environmental units and site accountants were rare:
 - “None of the accountants ever come to us in our department, but then again, we all live in our own little boxes” (Copyco EM3)
- Site accountants were members of environmental teams and committees

Environmental Achievements at the Sites

- The EMS and the activities of the environmental managers raised the ‘awareness’ of environmental costs and impacts at all levels of the site
 - “We try and make it routine to the management teams, as if it is second nature” (EM1 Copyco)
 - “Environmental awareness is very important and part and parcel of efficient management” (Iceco EM1)
- A small selection of the cost savings achieved:
 - “We cut energy consumption by 12.1% last year, quite a financial saving” (Iceco EM2)
 - “We are talking about £450 for a 5000 gallon tanker to take our waste away. We saved maybe £30,000 on special waste last year. That's a big cost-saving” (Copyco EM1)
 - “We can save nearly £2,000,000 during the next 2-3 years just by getting rid of polystyrene packaging. We suggest they use this corrupad which is actually cheaper than polystyrene and we won't have the disposal costs. A huge saving’. (Copyco EM1)
- Many cost-saving projects were no-cost or low cost in nature
- Driven by environmental managers utilising EMS information

Accounting's Role in 'Green' Management (1)

- Certain issues partially tackled by existing management accounting. For example:
 - Energy use
 - “We have always been pretty conscious in energy usage because we have always show it as a separate budgeted cost” (Iceco MA1)
 - Waste minimisation
 - “1% waste is worth about £1m, and we'd like to stay less than 3% - that's a lot of money. And we have been in the past rather higher than that, so we are really working hard at that” (Iceco MA1)
 - “As part of our cost sheets [for a shift] we are given an allowance for wasted ingredients” (Iceco PM1)
 - The use of activity based costing
 - “We do not use ABC in strictly environmental terms, but we do use it for utilities and energy use” (Iceco EM1)
 - “The two programmes [ABC and EMS] are focused on the same drivers of cost. I don't think one relies on the other. But I think they are both picking at drivers of cost, which is the important point. The issue of why do people undertake that activity? What drives it? ABC challenges it, so does environmental management, on water, particularly” (Iceco MA1)

Accounting's Role in 'Green' Management (2)

- Existing management accounting appeared to disguise or render 'invisible' certain environmental impacts at the site:
 - “The best way of getting an operator to take care is to show him what it costs and hold him to it. We are trying in the common areas to get metering of [trade effluent] quantities into local budgets. I think this will come in time but it isn't with us yet” (Iceco EM1)
 - “We could provide categories for environmental costs but it depends on what you define as environmental cost. It would be very difficult to do, and would have to be done in the same manner by other sites in the company” (Iceco MA1)
- Influenced by the precise organizational context in which environmental management was 'embedded'
- Largely decoupled from the majority of environmental initiatives and projects
- Provided ad-hoc assistance on certain projects
- As environmental cost-saving opportunities were revealed, accounting interest in the EMS increased

Accounting's Role in 'Green' Management (3)

- Support for most environmental projects only granted if financial hurdle rates were passed. Although the non-financial environmental benefits were formally documented:
 - “Take special waste. We've had to put some filtration kit in and it wouldn't get approved unless we could estimate that we would have a saving in a normal payback period”. (Copyco EM1)
 - “If the project does not stand up financially, then forget it, there's no point going forward” (Iceco MA1)
- At one site, EMS information was used by accountants to enhance the benchmarking of costs:
 - “We did some work with Britvic and Guinness at one point, and were looking at inefficiencies in waste” (Iceco, MA1)
 - “We compared, for example, the electricity, water and effluent for every litre of ice cream we make with our sister companies on the continent. On energy and utilities, we're better than everybody” (Iceco, EM1)

Was there evidence of EMA?

- No evidence of new EMA information systems
- No desire from accountants to develop such data.
- Budgeting and cost accounting often relied on information supplied by the EMS:
 - “On budgeting certainly. The budget accountant would speak to him [the environmental manager] about what is it going to cost us for water spillage, gas for nitrogen, effluent, what are the targets for next year, what are the activities, how many kilowatt hours, all that sort of stuff. Even the cost accountant might talk to him about particular product costs” (Iceco MA1)
- The EMS, together with the activities of the environmental manager, appeared to generate the necessary EMA-type data.

Did the EMS Provide EMA Information?

- Each EMS routinely collected a vast database of monitoring, compliance and performance data.
- Permitted environmental managers to reveal new 'visibilities' about cost causalities at the site, achieving substantial cost savings
- Provided environmental managers with an awareness of inaccuracies in the allocation of environment-related 'overheads' costs e.g. waste from buildings
- Provided a potential for future dialogue on the management of environmental issues

Postscript



- Copyco was awarded multiple environmental awards, but was subsequently closed down by its parent company. It won a further environmental award when left with a skeleton staff
- At Paperco, organisational commitment to an EMS eventually faded due to cost and time concerns.
- The Iceco site recently ceased operations
- Take a camera when researching environmental issues at a site!

Thank You!

Aide Memoire for Questions

- Little evidence of management accounting becoming 'what-it-should-be'. Similarities with the argument for strategic management accounting (SMA)
- EMA-type information being generated by non-accountants and EMS
- Management accounting involvement in site level environmental management, largely ad-hoc
- Environmental 'champions' driving 'greening'
- Potential for further interaction between accountants and environmental managers