



Financial and Other Reasons to Implement an Environmental, Health & Safety Management Information System (EMIS)

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June 2001

This paper was presented at the Air & Waste Management Association Annual Conference & Exhibition
in June 2001.

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2001-963

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ABSTRACT

In an ideal world, environmental, health & safety (EH&S) data are integrated with other core business processes, such as finance, human resources, maintenance, purchasing and process management. Though EH&S data come from almost all facets of operations, many organizations treat environmental management as separate from the rest of the business enterprise. Numerous companies have enterprise-wide information technology (IT) initiatives underway, and many of these fail to include EH&S topics. Thus, when companies look to emerging technologies to manage EH&S data, they are faced with a separate system justification.

This paper discusses several business reasons, both “hard numbers” and “soft,” for implementing an environmental management information system (EMIS). The “hard numbers” justifications include financial and other numerical models. One financial model is Return on Investment (ROI), though an environmental system justification should not rely solely on this model. Other financial models include Total Cost of Ownership (TCO), Economic Value Added (EVA) and Activity-Based Costing (ABC). A relatively new financial index is the Dow Jones Sustainability Group Index, which measures corporate sustainability in five key areas.

The “soft” business reasons for adopting an EMIS include government agency initiatives, enhanced compliance management and risk reduction, best practices and knowledge management. As the regulatory burden increases, organizations must manage volumes of data that are orders of magnitude greater than ever before. An automated system cannot ensure compliance, but having consistent and accurate EH&S data available on demand is a tremendous enabling tool. The ability to track all requirements that apply to a site is virtually unachievable without such systems.

EMIS can yield benefits in terms of business process improvements. The system merely provides the motivation and framework for evaluating and standardizing business processes across a site or an entire company. Finally, EMIS can yield tremendous benefits in the area of risk reduction. Systems also can reduce business risk by enhancing the organization’s image, increasing the effectiveness of communications, and allowing EH&S professionals to perform more value-added tasks instead of clerical duties.

INTRODUCTION

In an ideal world, environmental, health & safety (EH&S) data are integrated with other core business processes, such as finance, human resources, maintenance, purchasing and process management. Though EH&S data is derived from almost all aspects of operations, many organizations treat environmental management as separate from the rest of the business

enterprise. While more enterprise-wide IT initiatives are underway than ever before, many of these fail to include EH&S topics. Thus, when companies look to emerging technologies to manage EH&S data, they are faced with a separate system justification.

FINANCIAL MODELS TO EVALUATE EMIS PROJECTS

From a pure financial standpoint, EMIS projects are no different from other projects—companies want positive returns, or they are not willing to invest in the project. However, one should not rely *solely* on financial models to justify an EMIS, as there are indirect costs and benefits that are more difficult to quantify. Companies can use a variety of financial methods to determine the value of an EMIS project. Examples of financial models and tools are Return on Investment (ROI), Total Cost of Ownership (TCO), Economic Value Added (EVA) and Activity-Based Costing (ABC). In addition, Dow Jones recently developed a Sustainability Index measures corporate sustainability according to five principles.

Return on Investment (ROI)

What is ROI?

Most companies use standard financial metrics and ratios such as ROI. There are several ways a company can calculate ROI, including the Internal Rate of Return (IRR) and Net Present Value (NPV) for projects. Companies typically have internal thresholds for IRR and NPV, as well as a time period over which they expect the return. How soon will the EMIS project show positive financial impacts? Other ways to determine ROI are to calculate savings over the life of the EMIS or to calculate the payback period for the EMIS. Finally, companies may choose to use some of the models and tools discussed below.

Simply stated, ROI is a measure of the effectiveness of an organization's management, calculated as follows:

$$\text{ROI} = \text{NET INCOME} / \text{TOTAL ASSETS}$$

Why Use ROI?

Most organizations are comfortable with this method, and use it for large capital projects. For an EMIS project, ROI does not tell the entire story. First, an organization's management can delay expenditures to make the ROI "look good." The timing of project costs becomes critical in the calculation. Second, one needs to calculate the ROI at different times in the EMIS project's life cycle. The cost for software licenses and deployment are only a portion of the entire life cycle costs (see TCO section below). Finally, IT projects have many hidden costs in IT projects due to allocation of overhead costs for labor and hardware, so the total cost of the project over a given time may not be clear.

Total Cost of Ownership (TCO)

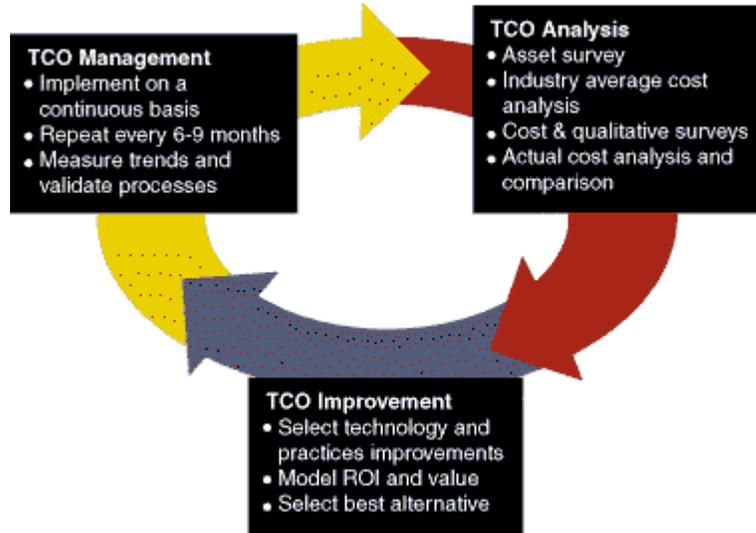
What is TCO?

Total Cost of Ownership models can help organizations understand 1) how much money is spent annually by the business to implement new IT, 2) the rationale for IT decisions, 3) where the money is being spent to manage the existing IT environment including service, support, training,

upgrades, procurement, policies, change management, etc., 4) where to look for these costs and 5) how to manage costs to deliver a competitive advantage.

Commonly accepted TCO models include those developed by the Gartner Group and the Forrester Group. The Gartner Group Lifecycle Model uses the approach shown in Figure 1.

Figure 1. Gartner Group TCO Lifecycle Model



Why Use TCO?

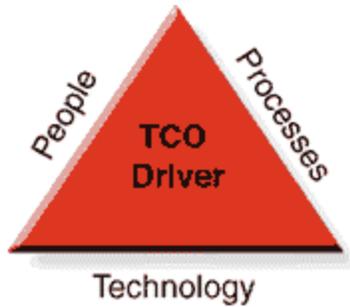
Compaq Corporation surveyed hundreds of financial executives and IT managers responsible for IT decisions. The survey revealed that only *four percent* of financial decision-makers realized that costs incurred after initial deployment comprise the largest component of IT cost. Costs incurred after the initial deployment can comprise up to 80 percent of IT cost, yet many decision-makers focus on controlling IT capital costs rather than the post-deployment cost.¹

Accurately identifying and tracking IT costs can be a challenge. Cost definitions vary between TCO models, multiple departments incur costs, and some costs, although real, may not be obvious. Further, accounting mechanisms typically aren't in place to capture both the identifiable and hidden costs within the enterprise. Any one of these points make it difficult for a company to determine which model to use, and the costs that should be tracked.

Factors Driving TCO

Organizations can reduce EMIS costs when they make investments in three areas: training people, streamlining processes and acquiring technologies that are easy to manage, service and support. Companies that aggressively implement such initiatives report large gains in IT efficiency and, as a result, significant reductions in TCO. For best results, a balanced focus is required on all three primary factors driving TCO.²

Figure 2. Three Primary Factors Driving TCO



People - train end-users and IT staff to make optimal use of cost-controlling processes and technologies.

Processes - automate some tasks and streamline others

Technology – deploy information technologies that minimize or eliminate the widest range of labor-intensive tasks.

Economic Value Added (EVA)

What is EVA?

Economic Value Added® is an economic model developed by Stern Stewart & Co. that is applied primarily to large businesses like Coca-Cola. It is complicated for small businesses to use. A positive EVA means that a company creates value. The simplified calculation is as follows:

$EVA = OPBT - TAX - (TCE * COC)$, where

EVA is Economic Value Added

OPBT is Operating Profit Before Tax

TCE is Total Capital Employed

COC is Cost of Capital

Why Use EVA?

Companies that use EVA are on the leading edge, as the model is relatively new. As with the models discussed above, EVA looks at the entire organization, and may not be appropriate to use for an EMIS project.

Activity-Based Costing (ABC)

What is ABC?

Activity-Based Costing is a set of calculations that help to determine the “true” cost of a product or service, as compared to traditional cost accounting, which allocates overhead costs to the product or service. The Activity-Based Costing model has five steps:

1. Identify activities
2. Determine cost for each activity
3. Determine cost drivers
4. Collect activity data
5. Calculate project/system cost

Why Use ABC?

Activity-Based Costing can help the organization discover opportunities for cost improvement. It is a good tool to improve strategic decision-making, and can be used to help prepare business plans. Activity-Based Costing can be used to evaluate EMIS projects. This tool can be used to figure the difference between “as is” and “to be” scenarios. It can be used to calculate the benefits of the EMIS due to automating routine, time-consuming tasks, sharing data and keeping staff growth to a minimum.

ABC is perhaps the best model for small, medium, or large organizations to use for EMIS evaluations. In contrast to models discussed above, it can better isolate the costs related to EMIS activities from the overall organization’s financial performance, giving a more realistic measurement. The challenge is to clearly identify all activities related to system planning, deployment, training, maintenance, support or other ancillary activities.

Sustainability

What is Sustainability?

Corporate Sustainability leaders achieve their business goals by gearing their strategies and management to harness the market's potential for sustainability products and services while at the same time successfully reducing and avoiding sustainability costs and risks. It is this pursuit and management that creates long-term shareholder value.³

Companies committed to corporate sustainability create long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments. The Dow Jones Sustainability Group Index (DJSI) measures corporate sustainability performance according to five principles: 1) Innovation, 2) Governance, 3) Shareholders, 4) Leadership and 5) Society. The DJSI identifies sustainability leaders and ranks their performance for investment purposes.

The DJSI family is derived from and fully integrated with the Dow Jones Global Indexes. They share the same methodology for calculating, reviewing and publishing the indexes. The DJSI consist of more than 200 companies that represent the top 10% of the leading sustainability companies in 64 industry groups in the 33 countries covered by the DJGI.⁴

How Does This Relate to EMIS?

Innovation. Companies that embrace sustainability invest in technologies and systems that use financial, natural and social resources in an efficient, effective and economic manner over the long-term. Implementation of an EMIS can help to increase opportunities and reduce risks to the

company.

Governance. An EMIS could be intertwined with the corporate management philosophy and quality programs.

Shareholders. An EMIS can help the organization to meet shareholder demands for sound financial returns, long-term economic growth, long term productivity increases, global competitiveness and contributions to intellectual capital.

Leadership. Many organizations that have enterprise-wide EMIS are seen as industry leaders, as they set the standards for best practices and maintain superior performance.

Society. EMIS can help organizations to better interact with people in the communities where they operate. Data would be more consistent and readily available to different stakeholders (e.g., clients, suppliers, employees, government, local communities) so organizations can better respond to specific needs.

OTHER JUSTIFICATIONS FOR EMIS

There are many non-financial reasons why organizations implement EMIS. The “soft” business reasons for adopting an EMIS include government agency initiatives, enhanced compliance management and risk reduction, best practices and knowledge management.

Government Agency Initiatives

The U.S. Environmental Protection Agency recently announced its National Environmental Achievement Track program. The criteria for entry include: 1) Environmental Management Systems (EMS), 2) Demonstrated Environmental Achievements and Commitment to Continued Improvement, 3) Public Outreach and Performance Reporting, and 4) Record of Sustained Compliance with Environmental Requirements.⁵ Any or all of these criteria could be used as a justification for an EMIS.

The U.S. Environmental Protection Agency (EPA) and various state agencies are taking the lead in electronic reporting initiatives. If regulatory agencies are developing electronic acceptance systems, then the regulated community must not stay too far behind and must have electronic submittal systems.

The EPA is working to introduce electronic reporting for all major environmental compliance programs. This includes reports submitted directly to EPA as well as reports submitted to state or local agencies under delegated programs. The EPA’s short term goal is to eliminate the cost to industry and government of using paper to transfer computerized data, while eliminating errors and delays involved in data entry into EPA databases. Their long-term goal is to use electronic reporting to streamline and automate data sharing among industry, environmental agencies and the public.⁶ The EPA has stated many benefits of their Electronic Data Interchange initiative, including potential cost savings of millions of dollars, significant enhancement of data quality; improvements to databases, dramatic improvements in speed/ease of data access; and opportunities to change the way the government and the regulated community do business.⁷

Enhanced Compliance Management and Risk Reduction

As the regulatory burden increases, organizations must manage volumes of data that are orders of magnitude greater than ever before. An automated system cannot ensure compliance, but having consistent and accurate EH&S data available on demand is a tremendous enabling tool. The ability to track all requirements that apply to a site is almost impossible without such systems.

EMIS can yield tremendous benefits in the area of risk reduction. These impacts may take the form of real-time roll-up reporting and the ability to use forward-looking (proactive) performance metrics instead of historical, backwards-looking performance metrics. Systems also can reduce business risk by enhancing the organization's image, increasing the effectiveness of communications, and allowing EH&S professionals to perform more value-added tasks instead of clerical duties.

Best Practices

What Are Best Practices?

From the business (EH&S) perspective, best practices are those practices that instill efficiencies and effectiveness in day-to-day operations. Implementation of Environmental Management Systems (EMS) is an example of "big picture" best practices.

From the IT perspective, best practices involve the proper deployment of technology integrated with process and management practices to deliver maximum usable functionality at minimum cost.⁸ Whether viewing best practices from the business or IT perspective, the triad of ***People-Processes-Technology*** plays a critical role.

Many organizations that seriously evaluate whether to deploy an EMIS understand the potential paybacks in terms of business process improvements. The EMIS merely provides the motivation and framework for evaluating and standardizing business processes across a site or an entire company.

How Does This Relate to EMIS?

Proactive companies want to move "beyond compliance" and want to implement best practices to remain competitive in global markets (see Sustainability section above). Companies are conducting benchmarking studies to determine how they compare in their vertical markets and/or to their peers across markets. Several questions regarding best practices relate directly to an EMIS project:

1. Does the company need to have an EMIS to be competitive?
2. What are the best practices before automation?
3. Which business processes are best automated using an EMIS, and which are best left alone (e.g., air, water, waste, MSDS management; calculations; document management; real-time monitoring, reporting, etc.)?
4. What is the best way to automate the current work practices using an EMIS?

5. Does the intended software system use best practices in its work flows?
6. What changes will need to occur in the areas of *People-Processes-Technology*, and how will these cascade through other systems, both manual and automated?

Knowledge Management

What is Knowledge Management?

Today's trend towards leaner organizations has heightened the importance of knowledge management. Organizations are struggling to keep pace with the growth of new knowledge, to capture the valuable knowledge as well-seasoned professionals move on to other jobs, and to challenge employees to work collaboratively. Knowledge Management can be defined as capturing, storing, disseminating and using organizational knowledge.⁹ The Innovation Associates process to improve knowledge management begins with assessing how effectively knowledge is shared within a unit, across units, and between an organization and other parties. It then considers the relative impacts of technology, content, culture, technology and process on knowledge management. Action planning enables people to consider how to best initiate and expand the KM process. The result is that implementation or enhancing a knowledge management process can maintain competitiveness and increase their ability to serve others. This requires a shift in thinking, shown in Table 1¹⁰.

Table 1. Knowledge Management Requires a New Mindset

Old Mindset	New Mindset
<ul style="list-style-type: none"> • Storing Existing Knowledge • Knowledge Exists in Individuals • Knowledge Exists in My Unit • All Relevant Expertise is Internal • Technology and Content Focus 	<ul style="list-style-type: none"> • Learning Continuously • Knowledge Exists in and is Created by Groups • Knowledge Exists in and is Created Across Units • Customers and Other Outsiders Have Valuable Knowledge • Culture and Process Focus in Addition to Technology and Content Focus

An organization's collective knowledge capital is embedded in the skills and experience of its employees, as well as in its processes and corporate information repositories. Product knowledge, customer and supplier information and operational expertise can give a company a business advantage in its industry. Knowledge capital is the lifeline of an organization, but management often underestimates its value. Companies like Dow Chemical, Monsanto, and Skandia AFS have already recognized that untapped knowledge capital is an enormous loss and are identifying ways to recognize it as a valuable asset.¹¹

How Does This Relate to EMIS?

Knowledge content is part of knowledge management. An EMIS must be designed to provide the right EH&S data (knowledge content) to the worker at the right time in the appropriate level of detail to do the job. The EH&S content to be included in an EMIS is typically is in many forms, including paper, electronic, and in people's heads.

A key aspect of EMIS projects is to define the IT needs. Improving the IT infrastructure as part of the EMIS can improve the knowledge management system, thus increasing the organization's value. Electronic groupware, messaging systems, discussion groups and data repositories can strengthen knowledge management and data sharing.

CONCLUSIONS

The justification for and Environmental Management Information System must consider both financial and non-financial models. Of the financial models, ROI is commonly used. The financial models that are perhaps the best fit for EMIS project evaluations are Activity-Based Costing and Total Cost of Ownership. Global leaders are beginning to manage by sustainability principles, and an EMIS can help to enhance corporate value.

Financial metrics does not capture all of the "soft," but often very compelling, reasons to implement an EMIS. Governmental agency initiatives, the desire to implement Best Practices, Knowledge Management and technology advances ultimately may cause organizations to rise to the challenge.

Financial and non-financial models can yield many benefits to organizations implementing an EMIS. These models can:

- Reveal costs and enable accurate measurement
- Improve decision-making; make justification more rational
- Sharpen forecasting and improve change control
- Improve IT cost management and budget controls
- Improve performance
- Enhance productivity and functionality
- Generate higher customer satisfaction
- Provide standard, consistent data
- Mitigate risks within EH&S and IT environments
- Raise business value

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KEY WORDS

ABC, Computer, Cost Accounting, Dow Jones, EMIS, Environmental Management Information System, EVA, Financial Metrics, Financial Models, Hardware, Information Technology, Information Systems, IRR, IT, IS, Knowledge Management, NPV, Software, Sustainability, Sustainability Index, TCO.