

Integrating Environmental Management Into Business Functions

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ABSTRACT

This paper describes a trend in environmental management that involves the integration of environmental considerations into business functions, and provides an example of a tool that is being used to facilitate that integration. The increased scrutiny of companies' environmental performance in the last few years has resulted in the recognition that environmental issues need to be considered in the context of planning for and doing business, and that environmental management cannot simply be a means for addressing the consequences of a business strategy. This paper summarizes the reasons for the increasing need to integrate environmental management into business functions and the ways in which companies are accomplishing that integration.

This paper also includes description of a materials screening system, which is one tool being used to integrate environmental considerations into purchasing and design functions. The key features and benefits of a screening system are described, along with a more detailed description of a screening system that has actually been implemented.

INTRODUCTION

The role of environmental management and environmental functions within companies has significantly changed over the last few years. As a result of the increasing awareness of the importance of environmental management in sustaining and growing business, companies are realizing the need to understand the environmental implications of many of their business functions. This, in turn, has led to the desire to integrate environmental considerations into these business functions so that environmental issues can be addressed during business processes, instead of addressing the consequences of those processes after-the-fact.

DRIVERS FOR INTEGRATION

There are many reasons why companies are increasingly looking to integrate environmental considerations into their business functions. Most of these reasons relate to the fact that there is now recognition of a new set of drivers influencing business decisions that reflect the environmental awareness and concerns of a variety of stakeholders. Figure 1 illustrates the role of environmental management in a traditional business strategic planning processes. In this traditional approach, drivers for a company's business strategy include issues such as trends in the global economy, consumer preferences and stockholder demands. (Obviously, these are only a few of the many factors typically considered in a business strategic planning process).

In this traditional approach, a number of strategic plans are developed for each of the major business functions within the company. In general, these strategic plans provide direction, goals and objectives for all of the operational programs within a company (e.g. marketing, sales, production, purchasing, etc.). In this traditional approach, the function of environmental management is to address the environmental consequences of these operational programs as efficiently and cost-effectively as possible. In other words, in this traditional approach, companies develop plans regarding what products they will produce, where and how they will produce them, and where and how they will market them, and the role of environmental management is to deal with the environmental consequences of those decisions.

In the traditional approach, the role of environmental management generally revolves around compliance with regulations. This generally involves gathering and analyzing the data necessary to permit facilities, fulfill reporting requirements associated with various regulations, and develop remediation plans to address the environmental consequences of past business decisions. Rarely, if ever, in the traditional approach is environmental management considered an integral part of the strategic planning process, and so there is little feedback regarding the environmental consequences of business decisions that can be incorporated into the planning process.

Gradually, however, this traditional approach is changing. Many companies have realized at least some of the potential benefits of a more proactive approach to environmental management, and so they may have some so-called “beyond compliance” programs. These typically include pollution prevention, energy conservation or recycling programs. In most companies, however, these programs are simply the outgrowth of personal interest of a few key personnel, and the recognition by senior management of some of the cost-saving and public relations benefits associated with these programs.

In other companies, however, there is recognition of the role of environmental management in the broader strategic planning process, and the potential for environmental management to help a company achieve its business goals of sustained profitability. This stems from a response to a new set of business drivers affecting the business strategic planning process. Figure 2 summarizes this new approach to strategic planning. One of the key differences between this and the traditional approach, is the explicit recognition of a new set of drivers, which are labeled in Figure 2 as “Sustainable Development Drivers”. While some people are uncomfortable with the term “sustainable development”, in this context it is designed to reflect those drivers of an environmental nature which may affect the long-term sustainability of a business. These include resource productivity, marketplace requirements, the cost of compliance, and stakeholder demands regarding environmental issues. (Each of these will be described in greater detail below).

The other key difference between this new approach to strategic planning and the traditional approach is that, as a result of these new drivers, there is now an explicit environmental component to a company’s strategic plan. This, in turn, provides the basis for environmental programs that are more fully integrated into the other operational programs within the company. This is a subtle, but fundamental, change in the role of environmental management, and has consequences for both environmental programs and business processes, since they both must be more “aware” of the other.

Without dwelling too much longer on the root causes of the need to integrate environmental management into business functions, it is worthwhile to discuss in greater detail the types of drivers that are causing this change. Thus, the discussion below provides greater detail regarding each of the key sustainable development drivers listed in Figure 2.

Resource Productivity

There is a growing awareness that in addition to the fact that energy and material use have environmental impacts, they have business impacts as well. Therefore, some of the issues related to resource productivity that are causing environmental issues to be considered more strategically include the following:

- The recognition that, regardless of environmental impact, wasted energy or raw materials represent inefficiency and excess costs.
- The dependence of manufacturing processes on the availability of raw materials, and the awareness that reliance on non-renewable resources may threaten the viability of those manufacturing processes in the long-run.
- The fact that many environmental issues are related to energy use, and that energy use can be a good indicator of the overall degree of environmental impact.

Marketplace Requirements

For many companies, particularly for companies that sell their products internationally, they face an increasingly large and complex set of requirements regarding what kind of products they can sell in various parts of the world. Some of these requirements include the following:

- Many countries have specific environmental criteria regarding products that can be sold in their countries. This includes such issues as recyclability of packaging, and banning of products containing certain materials.
- Eco-labeling, which consists of “seals of approval”, or informational labels regarding environmental issues are increasingly being used by customers to distinguish between products. While in the U.S. these labels have to this point consisted mostly of recycled content labels, in other parts of the world (Europe, in particular), there are a variety of environmental seals of approval, and a movement towards more environmental information on labels.
- Many companies are setting environmental requirements for their suppliers. This includes such programs as the product stewardship component of the Responsible Care® code used by the chemical industry, which requires working with suppliers and customers on environmental issues.

Cost of Compliance

The cost of complying with environmental regulations is perhaps the one environmental factor that was considered to any extent in the traditional strategic planning process. However, it is being considered in a new way in many companies:

- The cost of compliance is being more explicitly recognized as a cost of doing business, and it is being recognized that there are many decisions that are made that affect that cost without consideration of that impact. For instance, when a process change is made the time and cost associated with re-permitting a facility were typically not included in the decision-making process in the past, but are being recognized now.
- The disconnect between compliance with regulations and minimizing environmental impact is being recognized more explicitly by both industry and regulators. Thus, there is often a desire to explore alternatives that can both comply and minimize environmental impact.
- The increasing recognition on the part of regulators to cooperate and partner with industry. This type of partnering has been a part of the environmental regulatory landscape in Europe for many years, but is only starting to occur in the U.S.

Stakeholder Demands

The first part of this trend is the recognition of the variety of stakeholders that influence a company's business success. These include the "traditional" stakeholders that have been recognized for a long time, such as customers and stockholders, but also others like the local community, employees, regulators, suppliers, and non-government organizations. The second part of this trend revolves around the types of environmental issues that these stakeholders are raising:

- Many customers are requesting environmental information and establishing environmental criteria for their suppliers. This includes areas such as retail trade, where major retailers such as Home Depot and Wal-Mart have environmental criteria for their suppliers, as well as companies like IBM, which has sent a letter to all of its suppliers "encouraging" them to become certified to the ISO 14001 environmental management system standard.
- Individual consumers have indicated preferences for products with certain environmentally friendly features. In the U.S. this trend is just emerging, but it is a much greater factor in other parts of the world. One has only to look at the number of automobile advertisements touting environmental performance to realize that this trend has arrived in the U.S.
- The U.S. government has established guidelines for purchases of environmentally preferable products, with the intent that their power as a major purchaser will influence the manufacturing habits of companies.
- Environmental organizations in combination with local communities are closely examining the environmental performance of companies and individual facilities. The combination of the

information reported through the Toxics Reporting Initiative (TRI), and the ability to quickly share information through the Internet has resulted in a powerful tool for these organizations.

THE NEED FOR INTEGRATION

One of the primary impacts of this new set of drivers is the need to integrate environmental considerations into business functions. These drivers show that there are a wide range of people and organizations that are interested in the environmental performance of companies, and they are interested in a wide range of issues. These issues, in turn, are associated with many business functions of a company. It is no longer the case that the environmental issues of concern are related solely to what comes out of a pipe or smokestack. There are environmental issues associated with packaging, purchasing, the products themselves, and the way in which products are used and disposed.

Thus, there are two major reasons why environmental considerations need to be incorporated into business functions:

1. There are many people interested in environmental issues associated with all business processes within a company, and these people have a great deal of influence over the long-term success of a company.
2. There is recognition that many business processes beyond manufacturing affect the “primary” environmental impacts of air, water and land emissions and that to cost-effectively manage these impacts requires consideration of all those business processes.

WHAT ARE COMPANIES DOING TO ADDRESS THE NEED FOR INTEGRATION?

There are a number of actions and programs that companies have taken to address this increasing need for integration of environmental considerations into their business processes. Some of them have been discussed in describing the trends in drivers for business planning. The major categories of programs of this type are as follows:

- *Design-for-Environment* A large number of companies have developed some type of design-for-environment (DFE) program. DFE simply means a process by which environmental issues (as well as all of the other design criteria like performance and cost) are considered during the design process.
- *Product Stewardship* As mentioned previously, this is a component of Responsible Care®, the environmental management initiative being implemented by the chemical industry. Product stewardship involves interacting with customers and suppliers about the environmental issues associated with the use of products. Since it involves consideration of issues that go beyond the boundaries of a manufacturing facility, it is often considered a part of a broader trend towards Extended Product (or Producer) Responsibility (EPR). EPR embodies the concept that producers are responsible for the environmental consequences of their products even beyond their facility boundaries.

- *Full-Cost Accounting* This is a process by which the environmental costs associated with a product or process are captured in a financial analysis of that product or process. This approach was developed in recognition that many of the costs associated with permitting, reporting, or control equipment were not being factored into financial analyses used for decision-making. An area of controversy remains, however, regarding the need to, and process for, incorporating so-called indirect costs, such as the costs to society associated with increased emissions of a given pollutant.
- *Environmental Management Systems* Many companies are developing formalized environmental management systems (EMS), some using the ISO 14001 standard. An EMS facilitates integration of environmental issues into business processes by requiring an analysis of all of the activities and processes within a company that have impacts on the environment.
- *Screening Systems* These systems, which will be described in greater detail in the remainder of this paper, provide a tool for facilitating some of the programs described above. By screening potential purchases or potential product designs against chosen environmental criteria, they provide the basis for directly incorporating environmental considerations into those functions.

SCREENING SYSTEMS AS A TOOL FOR INTEGRATION

The screening system concept is extraordinarily simple. It involves the screening of materials, or ingredients within materials, against a series of “watch” lists that reflect various issues of environmental concern. If a match is found between an ingredient and a material on one of the watch lists, a “flag” is raised, alerting the user to this fact. Then, based on the nature of the system, and the particular function that is being screened, the user may be able to proceed, simply being aware of this potential problem, or the system may prevent the user from proceeding. While there are many detailed design issues, that is essentially the complete concept. Its simplicity allows it to be incorporated into a variety of business functions (purchasing and product design being the most likely candidates), and this ease of integration is the primary advantage of this approach.

Key Features of a Screening System

Having now developed a number of screening systems for different types of applications, we have developed a set of key features that we believe should be incorporated into a screening system in order to maximize its benefits. These can be considered the design principles for a screening system, and they are as follows:

- The screening system must be fully integrated into the business process that is being screened. This includes the need to integrate it into the information management systems used in that process.
- The screening system should operate “in the background” during normal execution of the business process, only making the user aware of its presence when a flag is raised indicating a potential problem.
- The types of watch lists that are incorporated should reflect the environmental issues of concern to a particular business and a particular process. The lists can be regulatory in nature, company-specific

(e.g. lists of chemicals targeted for reduction), or pro-active (e.g. materials that are being targeted for future regulatory action).

- The screening system should provide different types of responses depending upon the nature of the flag raised. For instance, if a flag is raised indicating that a purchase is being made that contains an ingredient on a pro-active watch list (i.e. this might be a problem in the future), the screening system would probably be designed to allow the purchase to proceed, with its function limited to providing this “warning”. On the other hand, if the purchase involved an ingredient on a substance banned by company policy, the system would prohibit the purchase from proceeding, unless an override by an authorized user was implemented.
- While not always necessary, the ability to track quantitative information is generally desirable in a screening system. In the case of screening purchases, this can often facilitate certain types of regulatory reporting (e.g. volatile organic compound (VOC) emissions can be directly calculated by the system based on the quantities of certain ingredients purchased). In the case of a screening system that addresses product designs, tracking trends in material use can often be a useful management tool.
- The screening system should provide for easy update and expansion of watch lists. The nature of these watch lists is that many of them change over time, and the ability to update the lists is critical. In addition, it is often desirable to start with a relatively limited number of watch lists, but to add on as confidence with the tool increases. As a result, it is important to be able to add lists relatively easily.

Benefits of Using A Screening System

The types of benefits that a company may derive from implementation of a screening system such as this are dependent on the type of company and the specific business process into which the system is incorporated. However, the types of benefits companies can expect, include the following:

- Increased global market acceptability of products. Many companies have been faced with the problem of finding out after a new product has been released that it cannot be sold in a particular country because of a restriction in that country on a particular ingredient. This causes very costly product recalls, or reformulation or re-design of products, all of which can be avoided through the use of a screening system that automatically screens product designs under consideration.
- Provides early warning that purchases or product designs may trigger regulatory requirements. This allows for a more informed decision regarding whether or not to proceed with that purchase or product design, and if a decision is made to proceed, provides the time necessary to efficiently meet the regulatory requirements (e.g. gathering the data necessary for reporting, or re-permitting, if necessary).
- Increases opportunities for pollution prevention. Very often companies have pollution prevention goals that relate to the use of certain substances, and the desire to reduce or eliminate their use. However, without the use of a screening system, many of the opportunities to reduce use or release

of certain substances are missed, because environmental managers only find out about the purchase or product design after it has occurred. The screening system introduces environmental considerations into these business processes at the point where they can most effectively produce change.

- The screening system incorporates environmental considerations into the purchasing, product design or other function without disrupting those business processes. Many efforts to introduce environmental considerations into business processes require that those processes be put “on-hold” while environmental issues are considered. This is a very cumbersome and inefficient process and causes the personnel involved in these processes to be very resistant to the incorporation of environmental considerations into their processes.
- When quantitative tracking is incorporated into a screening system, it provides the basis for more efficient environmental compliance reporting. In addition, this quantitative tracking can be used to gain a better understanding of material flows in a facility, which often leads to identification of additional pollution prevention opportunities.

EXAMPLE SCREENING SYSTEM

In order to facilitate understanding of how the screening system can be applied, this section describes a screening system that has actually been developed and installed at a manufacturing facility. This system was designed to screen purchases initially, with the intent that over time other processes will be included. The system was designed to be fully integrated into the company’s purchasing processes, and actually was used as the core component of an upgrade of the purchasing process at the company. The system was developed using a Microsoft ® Windows environment, and placed on the company’s intranet, since this is becoming the standard means for information management for this company.

The screening system was designed to provide two types of screening:

1. All materials to be purchased require a part number, and the screening system is used to assign those part numbers. The screening system prevents part numbers from being assigned if information from the applicable Material Safety Data Sheet (MSDS) is not entered. Thus, materials cannot be ordered unless an MSDS is in-hand and the appropriate information is entered into the screening system, because no part number will be assigned.
2. The second level of screening occurs at the point that a purchase is being made. For each material being purchased, the screening system finds the appropriate MSDS data regarding the ingredients in that material, and compares them against four watch lists. If the material has ingredients on the banned or prohibited substances list (those materials the company does not want brought on-site), then the purchase cannot proceed. If the material has ingredients on other watch lists, the purchaser is made aware of this through flags that show up on the screen, and a printed report regarding these flags must accompany the purchase order.

Figure 3 shows a screen-shot from the screening system that illustrates how information from an MSDS is recorded in the system. This shows the name of the material, a description of the material, its

manufacturer, the date of the MSDS, and information about the volatile organic compound (VOC) content. Below that information, the composition of the material is specified, using the data from the MSDS. In this screen-shot some of the data has been entered, and a pull-down menu is shown, which is one way additional ingredient data is entered. The pull-down menu, which shows both chemical name and CAS number is designed to avoid the need for the user to spell the chemical name of ingredients, and to ensure that the ingredient is being specified with the appropriate CAS number. This not only makes it easier for the user, but also avoids failures due to misspelling of chemical names.

The manufacturer name and MSDS date are used by the screening system to help the company keep its MSDS data up-to-date. The screening system prints out a quarterly report which provides the name of the materials for which orders have been placed during the last quarter, and the MSDS date is more than one year old. The report prints out the names and addresses of the manufacturers that have to be notified to facilitate that notification process.

The material category is used to help the company track material quantities by type of material being purchased. In addition, the VOC data is designed to allow for automated computation of VOC emissions based upon materials purchased.

Figure 4 provides a screen-shot of the purchase order process. In the screen, the user specifies the purchase order number, the supplier, the location initiating the purchase (this company has multiple locations), the department initiating the purchase, and the date of the purchase order. Below this information, the user specifies what materials are being ordered, and those can only be materials that have an assigned part number. The user then enters the amount of the purchase, and the screening system indicates if ingredients in that material have been found on any of the watch lists.

In this system, four watch lists are being utilized:

1. Emergency Planning and Community Right-to-Know Act (EPCRA, or SARA Title III).
2. Chemicals included in the company's toxics use reduction plan, filed in accordance with the Toxics Use Reduction Act (TURA), a law in the Commonwealth of Massachusetts.
3. The Massachusetts Contingency Plan (MCP), a state law that contains a list of chemicals similar to EPCRA.
4. Banned, or prohibited substances, which are those compounds the company does not want on-site.

It can be seen that in this instance, the first material, chromic acid, has an ingredient (in this case the material is a single ingredient) that shows up on the EPCRA and MCP lists, and so may trigger reporting requirements related to those regulations. The user can proceed with the purchase, and a copy of the report showing what flags were raised must be attached to the purchase order.

CONCLUSIONS

The increasing scrutiny of companies' environmental performance by a variety of stakeholders is changing the way companies do business, and perform their environmental functions. Environmental considerations increasingly need to be integrated into a number of different business processes, and environmental management can no longer consist of complying and remediating after-the-fact. However, it is often very difficult to efficiently and effectively incorporate environmental considerations into functions that are implemented by staff with no environmental training. Screening systems provide a useful tool for implementing some of this integration, and they are likely to be used with increasing frequency in the future.

Figure 1. Role of Environmental Programs in Traditional Strategic Planning Process

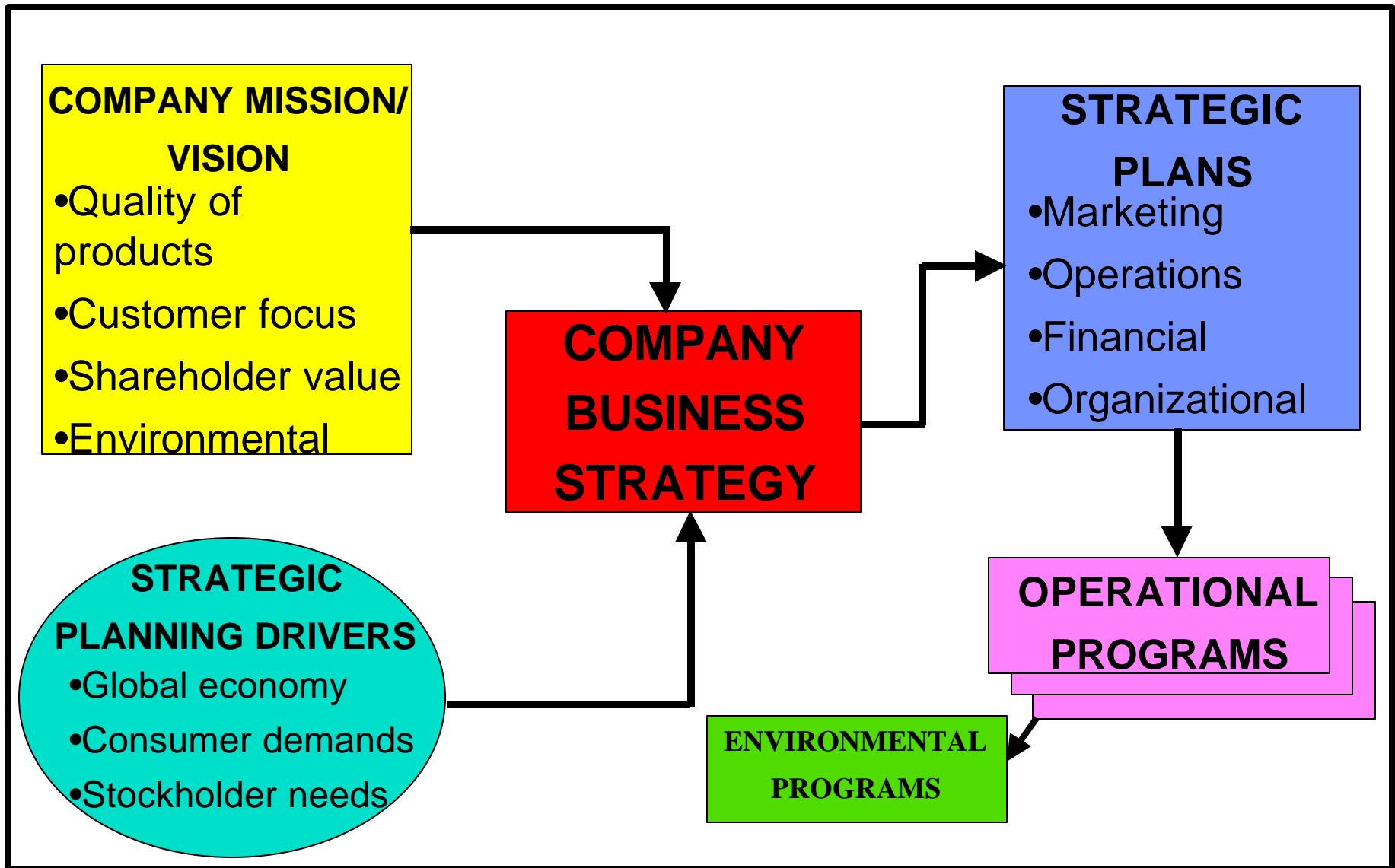


Figure 2. New Drivers Require Greater Integration of Environmental Planning and Programs

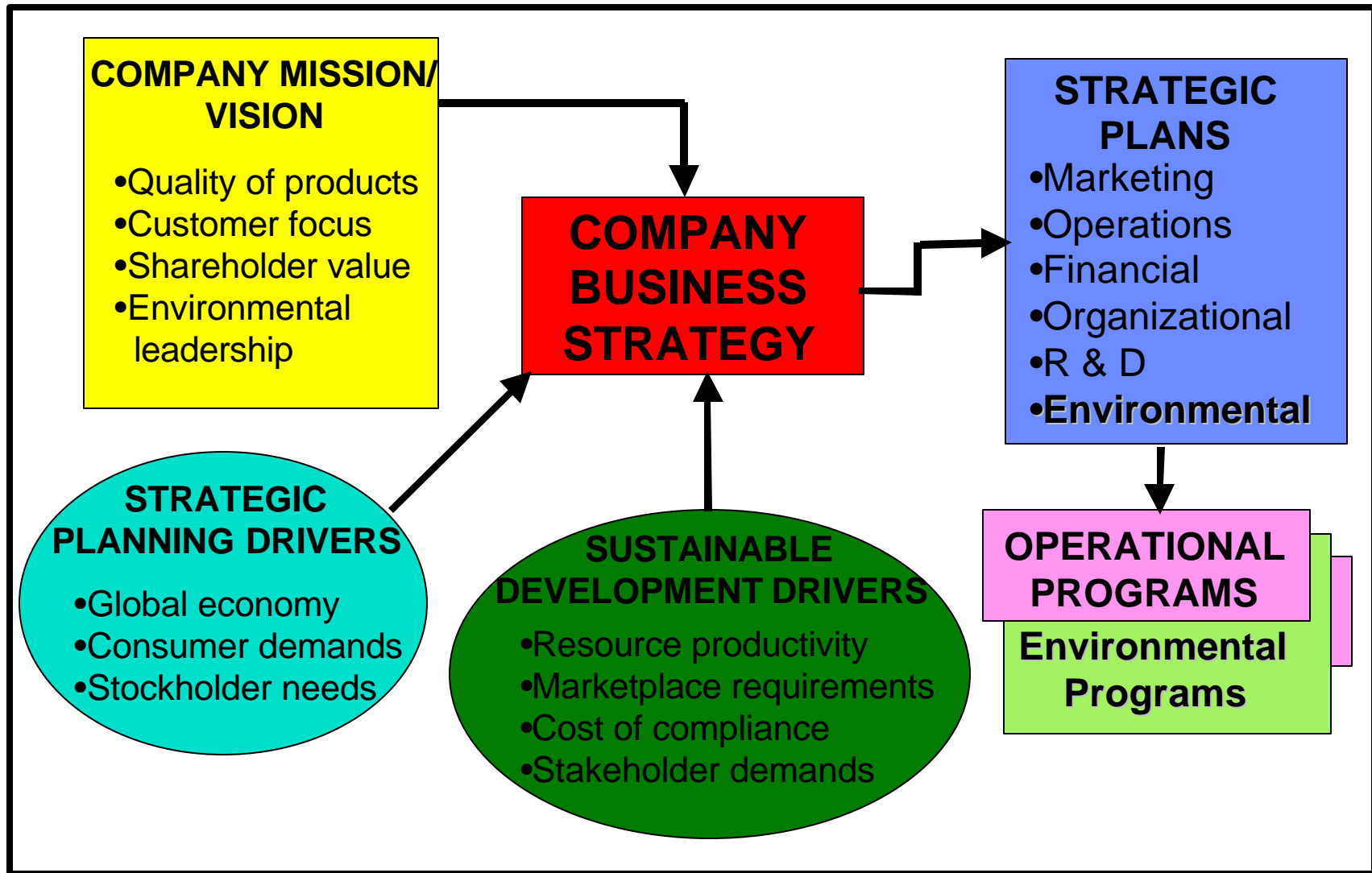


Figure 3: Specifying Ingredients for a Material to be Included in a Screening System

File Edit Material

Part Number: C000001 Category: Epoxy

Material Name: High Gloss Green

Material Description: test description for this material

Manufacturer: Van Son Holland Ink Corp. VOC Content: 6.85

MSDS Data: 5/19/98 Weight % VOC: 79.19

Material Ingredients		
Ingredient	CAS Number	Weight Percent
Naphtha	8030-30-6	32
Xylene, mixed isomers	1330-20-7	10
Particulate Matter < 10 Microns (PM10), Filterable		65
Particulate Matter (PM), Filterable		10
* [Dropdown]		

Ingredient	CAS Number
Ethylbenzene	100-41-4
Formic acid	64-18-6
Methylene chloride	75-09-2
Nitric acid	7697-37-2
Phosphoric acid	7664-38-2
Zinc oxide	1314-13-2
Naphtha	8030-30-6
2-Butoxy ethanol	111-76-2

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Figure 4: Screening of a Purchase Order

File Edit **Purchase**

Find Material
Screen Results

Purchase Order [min] [max] [close]

P.O. Number: Supplier:

Location: P.O. Date:

Department:

Materials to Purchase

	Part Number	Material Name	Amount (gal.)	EPCRA	TURA	MCP	Banned
▶	C000006	Chromic Acid	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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