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### Formulation and implementation of environmental strategies: A Comparison between U.S. and German printing firms

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# Formulation and Implementation of Environmental Strategies

A Comparison Between U.S. and German Printing Firms

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A Research Monograph of the  
Printing Industry Center at RIT

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## Introduction

In recent years, firms have increasingly recognized the strategic advantage of superior environmental performance. In response to changing pressures from stakeholders such as customers, environmental groups, local communities, and regulators, companies have realized that they need to strategically analyze their competitive context and integrate ecological principles into their comprehensive corporate strategies. In deciding on an environmental strategy, managers need to analyze the internal factors, such as the resources, infrastructures, and culture of the firm. They must also analyze the external factors, such as competition, regulations, and market conditions.

Despite the advancement in knowledge and practice in the area of strategic environmental management, there is very limited knowledge about the adoption of environmental strategy in the printing industry. As has been found in other industries, it is likely that printing companies can formulate and implement proactive environmental strategies in order to gain competitive advantages. These advantages include cost reduction, improved product quality, and improved relationships with external stakeholders, such as customers, regulating agencies, and local communities. In fact, there is evidence that some printers have been able to significantly reduce environmental impact, production costs, and compliance liabilities because they adopted proactive eco-strategies.<sup>1</sup> However, literature on environmental management in the printing industry mainly focuses on regulatory compliance and technological solutions. It seems that printing firms have not yet fully discovered the benefits of taking a strategic approach to environmental issues.

Here we outline the opportunities and challenges for printing companies that take a strategic approach to environmental issues. We summarize the experiences of four environmentally-proactive printing companies, and then discuss similarities and differences across the four firms and draw conclusions for printers interested in taking a more strategic view of environmental issues.

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## Printing and Environmental Management

The printing industry in the U.S. is comprised of approximately 62,355 firms with sales of approximately \$210 billion annually.<sup>2</sup> Thus, the industry is a significant contributor to the overall U.S. economy. Historically, this industry has also been a contributor to the U.S. manufacturing industries' negative impacts on the environment as well. Printers generate an array of both hazardous and non-hazardous waste. Principal among environmental issues in the printing industry is the release of volatile organic compounds (VOCs), which can come from many points in the printing process. Paper use and waste is also a significant concern for the industry.



### Small Firms

Small firms predominate in the printing industry. This raises a number of issues that are particular to small firms with regard to strategic environmental management. Because smaller companies have less developed management structures and shorter lines of communication, information exchange and teamwork is much easier to manage.<sup>3</sup> Employee motivation and involvement, quality, and performance can improve because workers increasingly control their own work patterns. However, previous research has shown that a majority of small firms do not employ formal strategic management techniques or implement environmental actions in order to achieve cost advantages.<sup>4</sup> This may be due in part to the relative absence of necessary capital, lower managerial awareness, and a lack of environmental management expertise in smaller firms.<sup>5</sup>

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## Method

Using public ratings and the opinion of industry experts, companies known for proactive environmental management practices were identified for this research. From that list, four companies were further selected for diversity in size and location. We wanted to compare large and small printers in order to learn more about how they differ. We also wanted to address cross-cultural issues as an important aspect of strategic decision-making by providing a comparison between German and American printing firms.

As seen in Table 1, the companies selected from this process were: Oktoberdruck AG (a small German company with 26 employees), Leipziger Zeitungsdruckerei (a large German printer with 250 employees), Alonzo Printing in California (a small American printing firm with 54 employees), and Hickory Printing (a large American printing company with 259 employees). The following case studies are based on interviews and communications with key respondents at the firms.

Table 1. Case selection

	United States	German
Small Firm	Alonzo Printing	Oktoberdruck
Large Firm	Hickory Printing	Leipziger Zeitungsdruckerei (ZDL)

## Case Studies

### Hickory Printing

Hickory Printing Group (Hickory) is a privately-held commercial lithographic printing company with two plants in North Carolina. The firm was established in 1917 by Mr. and Mrs. William Reese, the parents of the current chairman of the board, Thomas (Tom) Reese. In 2004, Hickory, with 259 employees and total sales of \$40.8 million, was ranked 123rd in *Printing Impressions 400*.<sup>6</sup> The majority of their clients belong to the furniture industry and are located in the U.S., east of the Mississippi River (though the firm also has clients in Mexico and Canada).

Hickory's commitment to environmental issues began with the personal beliefs of Tom Reese, who was influenced by his family's values and by the religious teachings of the Lutheran Church. Reese believes that natural resources are for the Earth's creatures and that these resources have to be used wisely to make sure that they are available in the future. Reese's appreciation for wildlife did not have much impact on his job when he started working at Hickory in 1950. But he started becoming actively involved in pollution control and the promotion of public awareness of environmental conservation in the early 1950s, and his interest in wildlife organizations and his work as president of the Wildlife Federation informed the formulation of his environmental philosophy at Hickory. As current CEO, George Glisan recalls, "[Reese] started to ask what he could be doing as a businessman to engage in practices that were good for the environment and conservation. He started doing things back before anybody really was thinking that these things would be worthwhile to consider or do."

Though Hickory does not have a coordinated environmental strategy, Reese believes his environmental initiatives will help the company's bottom line in the long-term. Hickory is environmentally conscious because Reese sees that as the correct way to do business, regardless of whether there is a return on investment. Reese says, "If you are responsible from an environmental standpoint, then you probably also [run a] responsible business. When we make decisions, we consider the impact we will have on the environment and what we can do to mitigate that impact."

Hickory's environmental management incorporates three components: enforcement/compliance, common sense, and research. As part of the enforcement/compliance component, Calvin McGill, vice president of Logistics and Engineering Services, is responsible for ensuring compliance with all environmental regulations. Maintaining compliance was Hickory's most important goal in 2004. As part of the common sense component, Reese instills his philosophy in his employees, who execute his ideas. Reese finds that the best way to get good suggestions is by talking to his employees via a comprehensive communication structure including all departments—press, purchasing, estimating, and logistics. Lastly, Reese is firmly committed to the third component—research—which he defines as finding ways to "improve the environment from a realistic standpoint, as opposed to a regulatory standpoint." While Hickory does not benchmark against other companies, Reese tracks various sources of information for new ideas about what the company could do to help the environment.

### Environmental Activities

As Bill Herbein, vice president in charge of Sales and Marketing, explains, Reese was “way ahead of the curve” with recycling initiatives. In the 1960s, when the economic depression encouraged Reese not to waste anything, Hickory began salvaging its waste paper. In the early 1970s each plant began recovering silver from the prepress process until the firm shifted from computer-to-film (CTF) to computer-to-plate (CTP) in 2000. In the 1980s, employees began salvaging paper from their offices and aluminum from their drink cans. Also in the 1980s, Reese became more interested in air quality issues, prompting Hickory to start programs to reduce emissions through the substitution of press solutions and elimination of some petroleum-based chemicals. In the mid-1990s, Hickory eliminated isopropyl alcohol in the fountain solution. They also tried soy-based inks, but discontinued further use because there was no exceptional reduction in VOC emissions. Reese insists that the firm continuously reduces its use of chemicals and invests in technology solutions, such as the implementation of a centralized purchasing system and automatic blanket washers. In recent years, Hickory’s environmental manager began looking for ways to reduce water and energy consumption, a first step in implementing a “green building” concept.

Hickory’s latest initiative reaches out to the community. In return for credits on their next printing orders, Hickory began collecting and recycling its customers’ waste paper along with its own. Hickory started its “outreach” waste management program because it wanted to help solve disposal problems for smaller printers and customers, as well as other local businesses, such as Roadrunner, Office Depot, and the local hospital. In the end, Hickory gained an economic benefit with this concept as well, recouping \$.05 to \$.08 per pound from the paper mill, depending on the market. In 2004, as part of another community outreach effort, Reese gave an endowment of \$3 million to Lenoir Rhyne College to establish an institute for natural resource conservation. This initiative was in line with Reese’s interest in research on environmental issues.

### Strategic Benefits

Since Hickory has implemented its community waste management program, its customer base has increased. Being a green printer also helps Hickory to save costs in purchasing and disposal because employees improve the material consumption. Furthermore, the reduction of waste going to area landfills and the conservation of natural resources bring Reese and Hickory’s employees personal satisfaction. Hickory has been recognized locally and nationally for its commitment to the conservation of natural resources. In 1994, the Graphic Arts Technical Foundation (GATF) honored Reese with the highest award in the printing industry for conservation—he was the first printer ever to receive the Dr. William D. Schaeffer Environmental Award.

### Zeitungsdruckerei Leipzig

Zeitungsdruckerei Leipzig (ZDL) was established in 1992 as a state-of-the-art plant in Leipzig/Stahmeln, specializing in web offset printing. ZDL is owned by two equal partners, the media enterprises Madsack Hannover and Axel Springer AG in Berlin. Each day, more than 250 employees produce approximately 520,000 *BILD* for distribu-

tion in Leipzig, Halle, Dresden, Chemnitz, Magdeburg, and Thuringen, and approximately 280,000 copies of *Leipziger Volkszeitung* (LVZ) for Leipzig, Delitzsch, Altenburg, Dresden, Eilenburg, Grimma, Doebeln, Oschatz, Wurzen, and Borna.

Since its inception, ZDL has been concerned about being environmentally friendly because of the company's commitment to its stakeholders, its parent companies, clients, the general public, and regulators. First, ZDL's parent firms established environmental guidelines for ZDL to follow. Second, advertisers at LVZ motivated ZDL to initiate environmental actions because ZDL wanted to maintain good customer relationships. Thus, ZDL's management personally believes that it needs to evaluate its own environmental actions because it produces a newspaper that informs the public about environmental topics.

Following the strategic goals of being compliant with regulations, saving resources, and achieving cost savings for input and output resources, the improvement of ZDL's business performance is the firm's main strategy. As described by Dirk Müller, who is among other things responsible for environmental protection, "Goals achieved yesterday will be evaluated today in order to see if improvements are possible tomorrow." Ulrich Ordnung, plant manager and CEO, monitors the achievement of strategic goals. For example, ZDL's goal for 2005 to 2007 is to reinvest in four web offset presses with state-of-the-art technology. Müller expects that the use of solvents will be dramatically reduced and VOC emissions will be lowered through the installation of automatic rubber blanket washing units in the new presses.

Interestingly, because ZDL's management believes that its environmental management is synonymous with performing well, the company decided not to get certified for international quality and environmental standards ISO 9001 and ISO 14001, or to receive the EU Eco-Management and Audit Scheme (EMAS) validation. ZDL decided to continue with an informal environmental management program because certification would just confirm what ZDL has already been doing successfully for years.

## Environmental Activities

Every year Müller compiles an ecological balance report evaluating all material and energy flows in the printing facility. Müller explains, "I can break it down to the point where I can see how many milliliters of development chemicals per printing plate we need." Ordnung and Müller compare the results of this "eco-balance statement" with specified goals and then define new modified aims. Although all managers are involved in the eco-balance-statement, the plant manager makes the final decision about what will be done and who is responsible for the implementation. Then employees have the opportunity to read the eco-balance-statement in detail in the corporate newsletter.

ZDL is a member of the *Bundesverband Druck und Medien* (BVDM), the Federal Association of the German Print and Media Industry in Wiesbaden. ZDL's managers study improvements in the field of environmental protection and share their experiences with other companies. Once a year, ZDL meets with other BVDM newspaper printers of similar size in order to compare ecological operations ratios. ZDL also works

closely with environmental protection organizations and consulting firms. ZDL has established good partnerships with its ink suppliers, who are members of the *Verband der Druckfarbenhersteller* and have signed a declaration of voluntary commitment not to use carcinogenic ingredients in their inks.

ZDL's initiatives are mainly related to process improvements, ranging from the reduction in packaging, the reduction in energy consumption through the facility's combined heat and power station, the recycling of solvents and used inks, to the reduction in chemical use through the shift from computer-to-film (CTF) to computer-to-plate (CTP) in 2004. The firm also concentrates on improving paper and ink consumption. When the newspaper production operation started in 1993, ZDL used partly (62%) recycled newsprint. Today, ZDL uses 96% recycled newsprint, while maintaining optimal print quality.

### **Strategic Benefits**

Since ZDL began to show its commitment to environmentally-sound newspaper production, relationships with stakeholders have improved. ZDL publicly and honestly communicates to its readers how the newspaper is produced, reporting both positive environmental experiences and the problems that the firm encounters. Process improvements, such as shifting over to CTP, created a more environmentally-friendly prepress operation and delivered a huge savings in time and material.

### **Oktoberdruck**

In 1973 Oktoberdruck was founded in Berlin, Germany, as a self-administered collective printing firm with five employees. The firm specializes in multi-color sheetfed offset printing. Since the fall of the Berlin wall in 1989, Oktoberdruck has grown from 12 to 35 employees, and has achieved annual sales of DM 5.5 million (approximately US \$3.4 million). Today, all of the current 26 employees own proportional shares of Oktoberdruck and collectively determine within democratic structures how the firm operates. Though Oktoberdruck can claim 30 years of successful functioning as a self-administered collective company, there is no set of formal guidelines that expresses how the company operates.

The company's self-administered organization grew out of its founders' collectivist vision and political ideology. The organizational structure is the most important factor in any strategic decision the firm makes. All employees strongly believe in autonomy and the concept of a self-determined work ethic. Oktoberdruck considers environmental commitment to be its natural responsibility, and its employees' alternative way of thinking laid the groundwork for the firm's environmental consciousness. The firm's long-term goal is to conserve the environment for future generations while maintaining company values and a healthy business. Oktoberdruck tries to achieve this goal through flexibility and attentiveness.

## Environmental Activities

In 1985 and 1986, Oktoberdruck participated in a study entitled “An Investigation of the Environmental Impact of an Offset Printing Company,” which was conducted by students of the Technical University of Applied Sciences in Berlin. The study resulted in the firm’s first major investments in work safety, such as the implementation of an exhaust air unit, a ventilation system, and a noise protection wall. Since then, Oktoberdruck has improved its environmental performance by decreasing the number of car trips by using bike couriers, reducing the consumption of packaging materials, improving the filtration of fountain solution, reusing cleaning cloths and wrapping paper for packaging, and substituting steel straps. Since implementing changes in internal safety training on chemical handling and storage, as well as training on paper consumption and customer service, the proportion of recycled paper used by the firm increased from 24% in 1997 to 38% in 1999. Because it believes that innovation and technology are essential for staying competitive, the firm also conducts research and development and involves vendors and manufacturers in ecologically-oriented troubleshooting.

In terms of management practice, in 1995, Oktoberdruck was the first printing firm in Berlin/Brandenburg to implement an environmental management system (EMS) and to be validated by the EU Eco-Management Audit Scheme (EMAS). This supports the firm with environmental strategic planning, such as formulating goals and environmental programs, benchmarking against other firms, and training employees. Though the executive team is responsible for compliance with environmental requirements, every employee is involved in the firm’s decision-making and implementation process. Employees from each department form an environmental committee that meets on a regular basis to exchange information, advise management, and participate in decision-making.

After Oktoberdruck relocated within Berlin in 2001, it decided to start all over again with the EMAS validation process. The firm felt it needed to react to a reorientation of political and social values and to the increasing ecological pressures in the printing industry. As Martina Fuchs-Buschbeck, the current president, points out, “In recent years, environmental issues have begun to be perceived as political issues.” Oktoberdruck’s environmentally-conscious customers, who are primarily independent publishing companies, environmental groups, and agencies located in Berlin, became accustomed to the fact that the firm is audited. Since August 2004, Oktoberdruck has been preparing to implement an integrated management system that addresses quality, environmental, and health and safety issues. It has also been preparing for the new EMAS validation.

## Strategic Benefits

Not only did Oktoberdruck receive an award for environmentally-conscious corporate management from the *Arbeitsgemeinschaft selbststaendiger Unternehmer e.V.* (Consortium of Self-Employed Entrepreneurs), it also gained financial advantages when applying for and receiving federal funding. Despite the pressures from the environmental regulating agency *Umweltbundesamt*, which Oktoberdruck had faced during its relocation in 2000, the firm realized immense process improvements after purchasing new



printing presses and other machines with environmentally-friendly aspects in mind. In addition, with the goal of approaching new clients and satisfying its existing customers, the firm began to use its environmental stance as a marketing tool and as a value-added customer service.

### Alonzo Printing

Alonzo Printing Corporation (Alonzo) was founded in 1976 by Jim Duffy in Hayward, California. It is a union shop that specializes in sheetfed and web offset printing. Today, the company has 54 employees and generates about \$9 million in annual sales. Alonzo's clients include corporate and non-profit organizations, publicly-held companies, financial institutions, environmental groups, government agencies, and political organizations.

Originally, Duffy was not as focused on Alonzo's environmental impacts. However, in the late 1980s, Duffy's thinking on environmental issues changed when he met Alan Davis, the founder of Conservatree Paper, which is a non-profit organization dedicated to converting paper markets to the use of environmentally-friendly papers. After meeting Davis, Duffy informally integrated environmental issues into the company's strategic decision process. It seemed easy to promote the new environmentally-friendly philosophy because, in his opinion, the San Francisco Bay area has the nation's highest regard for environmentalism outside Washington, D.C. However, he recalled, "the most influencing factor [was] just personal commitment."

While Alonzo's basic goal is to be compliant with federal standards, its broader environmental goal is to once again offer recycled paper for everybody. At one point, an executive team, consisting of the president, the vice president, the sales manager, and a couple of operations personnel, met for the express purpose of discussing how they could further execute the philosophical beliefs of being an environmentally-friendly printer. At this meeting, as an employee recalled, "We began to look at all of our processes, all of our marketing, all of the types of clients we go after and [decided] to pitch them on the value of being an environmental printer, [distinguishing] between being an environmental printer and a printer who prints on recycled paper." They believed that small- to medium-sized companies like Alonzo would not be able to integrate the kind of technologies that Alonzo has unless environmental issues were also an important component of the value they offer.

Alonzo is in a geographic area with very stringent environmental regulations. Since Alonzo's clients are primarily local businesses, many are very interested in environmentally-sound business practices. Alonzo realized that non-profits, and more recently, for-profit American corporations, are acknowledging their clients' or shareholders' increasing demands for the use of recycled paper. To some extent, Alonzo had tried to bring customers in from that niche market. In the latter part of the 1990s, Alonzo had to react to the changes in the marketplace. A recession forced the firm to rethink its capabilities because environmentalism had taken a backseat in the mind of price-conscious customers. To date, Alonzo still feels the effects of that recession. Recently, Alonzo's new marketing and brand communications firm, Traversant, is helping them to promote its former environmentally-friendly image, since most people still remember Alonzo as



an environmentally-friendly printer. In 2004, Traversant started targeting environmentally-friendly customers and took the chance of distinguishing Alonzo through a brand communications strategy.

### Environmental Activities

Alonzo was the first printer in Alameda County, California, to be certified as a “Green Business.” Its main environmental initiatives are the standardized use of recycled paper and soy-based inks. In the late 1980s, Duffy convinced Alonzo’s main supplier, Weyerhaeuser Paper, to produce paper with a greater percentage of post-consumer content. Duffy continued Alonzo’s partnership with Weyerhaeuser in order to move to 30% post-consumer content. At that time, Alonzo published its first environmentally-focused ad in *Garbage Magazine* and established the “Save a Tree” program. The company began to offer recycled paper as a standard rather than a custom-order stock and was the first company to use Kenaf paper, a non-wood paper alternative. Alonzo prints without any alcohol in the printing presses and uses a computer-to-plate (CTP) process. It recycles water, paper, office waste, and solvents. It is also involved in education and exceeds all the regulatory compliance standards.

Alonzo measures its environmental friendliness by handing out surveys to clients about every eighteen months and integrating the results with its own employees’ feedback to see whether external perceptions match internal perceptions. The company conducts internal “eco-audits” in order to compute its water, electricity, and gas usage, as well as its paper, ink, and solvent usage.

### Strategic Benefits

Since Alonzo began pursuing an environmentally-friendly strategy, the firm has established a good relationship with its union and retained many of its customers. The firm is recognized by various private and government agencies for its environmental leadership. The implementation of the CTP system helped Alonzo minimize labor, save time, and at the same time improve the quality of environmental activity. Traversant believes that the marketing message of Alonzo’s environmental stance as value-added service will differentiate Alonzo from its competitors, attracting new customers. However, Alonzo is still challenged in convincing paper companies about the cost-effectiveness of their increased use of post-consumer paper.

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## Comparison of Strategy Formulation and Implementation

Each of the companies overviewed in this paper have taken what printing experts and/or environmental professionals consider a leadership position with regard to environmental management in the printing industry. All four companies succeeded in creating a competitive edge, ranging from reducing costs to improving stakeholder relations to capturing and retaining customers. Yet the environmental strategies of each of these companies

differed depending on each individual company and the competitive forces it faced.

### Leadership and Motivating Factors

One of the strongest findings from these cases was that leadership and personal commitment of the members of the firm were critical to the success of environmental strategy formulation and implementation. In each of the companies, leadership came from the CEO and/or founders of the organization. For Hickory and Alonzo, it was the CEO's passion for environmental issues that drove the organization to move beyond compliance. At Oktoberdruck, it was the values of the management team as a whole. For ZDL, the parent company passed on its passion for environmental issues. Over and over again in the interviews, the influence of these leaders in creating a culture in which environmental issues were important was clear. Without strong leadership, a proactive environmental strategy is not possible in the face of constant pressure to resort to more traditional means of achieving strategic success.

That is not to say that these firms are, depending on each firm's strategic focus and context, not also driven by external stakeholders, such as regulators, environmental organizations, and clients. However, it seems that such factors were more prominent in the later stages of environmental initiatives. Once an image was established, particularly through long-term commitment, firms tended to maintain or improve their relationships with external stakeholders. At the same time, the internal factors, such as personal long-term commitments and leadership of top management and employees, remained important to maintain an environmental focus and overcome challenges.

### Strategy Formulation and Implementation

There are two primary paths to the strategy formation process: the *deliberate strategy* provides the organization with a purposeful direction (i.e., an intended course of action leading to the realization of the strategy), whereas the *emergent strategy* is more of a process of learning.<sup>8</sup> As shown in Figure 1, a somewhat surprising finding was that both small firms deliberately developed an environmental strategy as a means to attract and retain customers, whereas the large firms had a more emergent feel to their environmental strategy and primarily focus on the continuous introduction of technological solutions and process improvements. Both small firms stated that increasing market pressure made it essential to maintain their niche market by offering their customers

	Small	Large
German	Deliberate	Emergent
American	Deliberate	Emergent

Figure 1. Types of company strategy

## Comparison of Strategy Formulation and Implementation

ecologically-sound products and integrating this environmental element as a value-added service. This helps to differentiate them from other competitors and redefine competitive markets.

For all four companies, regulatory compliance was the cornerstone of their environmental strategy, but all understood that this was not sufficient for being an “environmental” company. After compliance, all four companies concentrated on process improvements and the resulting increased efficiency which had the added benefit of saving resources and reducing costs.

Beyond compliance and resource conservation the strategies differed, depending on the history, culture, external pressures, and capabilities of the organization. For example, each company took a different approach to environmental product strategies. As can be seen in Table 2, each company took a different approach to the use of “environmentally-friendly” inks and paper. While Alonzo Printing uses 100% post-consumer paper as their house stock, Oktoberdruck and ZDL increasingly offer recycled paper as a house stock and Hickory prints on recycled paper if that is requested by the customer and the customer is willing to pay the additional cost. This was partly because Alonzo (in California) and Oktoberdruck and ZDL (in Germany) had a customer base that was more likely to value recycled paper. In addition, Reese at Hickory, a conservationist, does not perceive the environmental benefits of using recycled paper as the three other companies do. To him, the biggest environmental impact is the reduction of waste. But the reuse of scrap or recycled paper should be limited to products of lesser quality because the production of high quality recycled printing papers causes other environmental problems.

There was evidence that national context may have also had an influence on how strategy is implemented. Both German firms had a greater focus on goal setting than their American counterparts. In addition, both German firms undertook formal benchmarking of environmental performance and management. In ZDL’s case, the results of process improvements are compared with other newspaper printing firms. Oktoberdruck primarily benchmarks companies that are EMAS-certified or have environmentally-sound technology. It may be that these differences are influenced by national culture and higher levels of social demands for accountability with respect to environmental issues.

Table 2. Comparison of ink and paper choices

	Oktoberdruck	ZDL	Alonzo	Hickory
Papers	Increased use of paper with recycled content	Majority of paper is recycled paper	100% post-consumer paper as house stock	No recycled paper unless requested
Inks	Vehicles in inks are 80% vegetable oil	Uses soy-based ink	Always uses soy based ink	No vegetable oil ink

### Challenges

The challenges that these four companies have faced vary in importance and strategic focus. Oktoberdruck faced its main challenge when the firm relocated because the firm had to go through the process of EMAS revalidation again. As is often the case for small firms, both Alonzo and Oktoberdruck encountered financial limitations, which have made technology investments more difficult. Oktoberdruck, however, has been able to overcome some of its financial shortcomings through federal research funds. In addition, given Oktoberdruck's unique organizational structure, it has also been able to make necessary investments in technology by cutting wages in agreement with all employees.

For Alonzo, a key part of its strategy was standard use of recycled paper. Alonzo must educate customers on the benefits of printing on recycled paper because recycled paper still costs more than virgin paper. Particularly during an economic downturn, it becomes difficult to convince price-conscious consumers to consider the environmental ramifications of their choices.

Hickory, which does not use recycled paper, perceives its main challenge in the environmental arena as building cooperative relationships with environmental organizations. As an industry leader, another challenge for Hickory has been to convince other businesses, and particularly clients and suppliers, to prevent pollution as well.

In sum, there are basic similarities among these proactive firms. However, the process of strategy formulation, the focus of strategic initiatives, and the mechanisms used to implement environmental strategies differed. These choices are affected by the firm's consumer base, product offerings, competitive positioning, and beliefs about what are truly "environmentally-superior" choices.

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## Suggestions for Practice

The case study results indicate a transition in the printing industry from initiating environmental actions ad-hoc to formulating and implementing environmental strategies. Yet, there is still potential for deliberate environmental strategies in printing firms. Before a company can formulate and implement a strategy, management should analyze all factors facing the firm and influencing the managers' perception of environmental issues.<sup>9</sup> Porter and Kramer (2002) introduced a comprehensive framework of competitive context that includes four elements:

- **Factor conditions:** Internal drivers of a company's environmental strategy, such as human and capital resources, physical, administrative, technical, and information infrastructure, and material resources.
- **Context for strategy and rivalry:** The presence of local policies and incentives that encourage investment, as well as the presence of open and vigorous local competition.

- **Demand conditions:** The presence of demanding customers, both nationally and globally.
- **Related and supporting industries:** The presence of locally-based suppliers and companies in related fields.<sup>10</sup>

Building from the case studies and existing literature, Table 2 outlines the factors that should be considered in each of these areas when undertaking a comprehensive environmental strategy.

Drawing from the four case studies, even the most environmentally-proactive firms are not likely taking this type of comprehensive approach to strategy development. All four firms we looked at considered factor conditions, with a focus on reducing material use and waste. Two of the firms also integrated demand conditions into their strategy, clearly identifying and targeting customers with an interest in environmental issues. More sporadic focus was placed on the remaining two factors: context for strategy and rivalry and related and supporting industries. Yet there were strategic opportunities in these areas as well. Oktoberdruck was able to identify government assistance for environmental initiatives. Hickory Printing reached out to suppliers and firms in other related industries for ideas on new technologies.

Clearly, each printing firm needs to find its own approach to environmental strategy formulation and implementation because each firm's individual and national context is different. Depending on the unique mix of the strategic focus and actions, however, there are opportunities for printers to gain competitive advantages through differentiating themselves from competitors, reducing costs and environmental impacts, preventing compliance liabilities, increasing customer bases and revenues, and retaining customers. Taking a holistic, strategic approach is the first step in identifying these opportunities.

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## Endnotes

<sup>1</sup> Cross, L. (1994, October). Printers take eco-initiative. *Graphic Arts Monthly*, 66(10).

<sup>2</sup> 1997 estimates. U.S. Census Bureau, <http://www.census.gov>.

<sup>3</sup> Dalessandro, W. (Ed.). (2001). *Critical Issues in Strategic Corporate Environmental Management*. Arlington, MA: Business and the Environment, Cutter Information Corp.

<sup>4</sup> Tilley, F. (1999, July/August). The gap between the environmental attitudes and the environmental behavior of small firms. *Business Strategy and the Environment*, 8(4), 238-248; Petts, J., Herd, A., Gerrard, S. & Horne, C. (1999, January/February). The climate and culture of environmental compliance within SMEs. *Business Strategy and the Environment*, 8(1), p.14-30.

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- <sup>6</sup> Printing Impressions (2004). PI 400. Retrieved January 10, 2005, from <http://www.piworld.com/doc/285045826397739.bsp>.
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- <sup>8</sup> Hax, A. C. & Majluf, N. S. (1991). *The strategy concept and process: A pragmatic approach*. Englewood Cliffs, New Jersey: Prentice Hall.
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## Appendix

Strategic Area	Example(s) from Cases
<b>Factor Conditions</b>	
Are there opportunities to reduce material use and resource costs through material consolidation and increasing operational efficiency?	Implementation of a central chemical purchasing system (Hickory).
Will leaders support a proactive environmental strategy?	Active leadership in all four firms.
Is there an appropriate management structure for strategy implementation?	Adoption of formal EMS (Oktoberdruck).
Are the environmental values compatible with the overall corporate value system and culture? If not, can they be?	Development of strong environmental values as essential element of the corporate culture (Oktoberdruck and Hickory).
Is there sufficient human capital to implement the environmental strategy? If not, what training or new personnel is needed to build such capital?	Encouragement of employees to give suggestions for improvements (ZDL).
Are there sufficient environmental research and development capabilities to support a proactive environmental strategy?	Issue of concern particularly for smaller firms (Alonzo).
Can the firm use or create environmental expertise in the firm to create new products, services or markets?	No example.
<b>Demand Conditions</b>	
Does the firm have or can they target environmentally-conscious customers?	Creates an environmental marketing strategy to create demand for environmentally-sound products (Alonzo).
Will customers pay a price premium for environmental performance?	Search for environmentally-conscious customers, such as environmental organizations (Alonzo and Oktoberdruck).
Can the firm increase customer interest in environmentally-superior products?	Include environmental information in all marketing (Alonzo and Oktoberdruck).
Can environmental performance be a value-added service?	Make environmental quality a basic element in customer service and sales (Oktoberdruck and Alonzo).
Can the firm use trustworthy media to promote firm environmental behaviors?	No example.
Will the firm have to develop different environmental marketing plans for national and global markets?	No example.



## Appendix

Context for Strategy and Rivalry	
Is the firm already compliant with existing environmental regulations?	Compliance was the base of the environmental strategy for all four firms.
Are there local policies or incentives that encourage investment in environmental technologies?	Searches for federal funds and participation in government projects (Oktoberdruck).
Are there ways to influence regulations, permits, and licensing to add costs to competitors' operations?	Have an active voice in regulatory development (Hickory).
Related and Supporting Industries	
Are there opportunities to build partnerships with suppliers on new environmental technologies or services?	Building partnerships and strategic alliance with paper suppliers (Alonzo).
Are there opportunities to establish strong relationships with environmental agencies to reduce compliance costs?	Constantly communicating with environmental agencies (ZDL).
What sources of financial support from federal, state or local agencies exist for environmental improvements?	Searching for federal funds and participation in government projects (Oktoberdruck).
Is the firm engaged in industry associations that provide information on new environmentally-superior technologies?	Participating in industry associations for information exchange (ZDL).
Is the firm making the most use of industry association, university, and government technical assistance programs?	Working with and support educational institutions (Hickory).
Does the existing material flows infrastructure need development for successful strategy implementation?	Helping to consolidate waste from customers to develop recycling infrastructure (Hickory).





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