



The Deluxe Corporation's PrintWise System: An Innovative Solution to a Long-Standing Environmental Problem

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With a market share of over 50%, Deluxe Corporation was the largest printer of checks and related financial forms in the United States. The lithographic printing process the company had been employing at about 50 facilities in the U.S. resulted in significant volatile organic compound (VOC) emissions regulated by the Clean Air Act. Although conventional inks contained VOCs that contributed to the environmental problem, Deluxe's main concern was the VOC-rich solvents used to clean the presses.

As a check printer, the company received an enormous number of small orders: more than 100 million a year. This resulted in frequent runs, which required frequent replacements of the lithographic plate. After each change, the "blanket" (the roller that takes the image from the plate and transfers it to the paper) had to be cleaned with a volatile solvent. This combination of petroleum based inks and solvents made Deluxe a "major emitter" of VOCs under the Clean Air Act, and complying with its increasingly stringent requirements was projected to result in higher production costs.

At the same time, the long-predicted slowing of demand for printed check forms was taking place. Credit cards, debit cards, and ATM machines were replacing a growing percentage of the checks heretofore used by consumers to make purchases and pay bills. Adding to the check printer's problems was the consolidation taking place in the banking industry. Mergers and acquisitions and lessening banking regulation were creating larger, multi-state banks with enhanced bargaining power with their suppliers.

Well aware of these long-term trends, the Deluxe Corporation diversified during the preceding eight to ten years, looking for other opportunities that could benefit from Deluxe's core competency of printing large numbers of small runs of personalized documents efficiently and with high quality. Several acquisitions were made to implement this strategy. In addition, the company expanded into other service businesses that shared its large customer base of financial services providers. For example, it provided these clients with electronic funds transfer software, assistance with new-account verification, and sales development information.

As a result of these investments, Deluxe was able to keep its revenues growing during the past few years, but only at a rate of about half of what it had been ten years previously. Since the new businesses had lower margins, overall margins contracted, compounding Deluxe's problems. Given these trends, the company could ill afford to absorb rising costs to meet the increasing environmental requirements in its mature core business.

Innovative Solution to Pollution Problems

When the company searched the marketplace for a viable substitute for its existing VOC-intensive printing system, it didn't find anything that could lower its environmental compliance costs and maintain the quality and efficiency of operations. Manufacturers of lithographic ink did not make the solvents that were devised to remove the residual ink on the blankets. When Deluxe spoke to the ink manufacturers about its VOC emission problem, they responded that their inks

were not the most significant VOC source—it was the solvent used for cleaning that was the principal villain. When the company turned to the solvent manufacturers, it was told that the solvents were particularly polluting because the composition of the inks required it.

After frustrating attempts to get ink and solvent producers to come up with a solution to the company's environmental problem, Deluxe Corporation came to the conclusion that it had to solve the problem itself. It set about to do what ink manufacturers and ink solvent manufacturers seemed incapable of doing: treating the ink and its solvent as a system and redesigning it to eliminate or greatly reduce the pollution at the source by eliminating or greatly reducing the use of VOCs.

Although "soy inks" were a possibility, they were not the solution to Deluxe's problem. Such inks are 7-40% soybean oil, with the balance still composed primarily of non-volatile petroleum distillates and only 0-4% VOCs. Although this greatly reduced VOC emissions from the ink, the solvents required for cleaning still had to be VOC-based and thus remained a major source of VOCs.

By looking carefully at the ink and its solvent together as a system, Deluxe was able to come up with a solution: it introduced an ink that uses 100% vegetable oils and can be cleaned from the blankets with a specially formulated, water-based solvent free of VOCs. By careful control of the chemistry of the ink and the ink wash, the ink remained water-insoluble during the printing process but was then rendered soluble upon application of the wash. No significant changes were required of the printing process. Since the new ink was 100% vegetable-oil based and the ink wash consisted of 95% water and 5% ordinary caustic, relatively benign cleaning chemicals, the wastewater produced by the cleaning process could be discharged into the sewer system without harm.

Deluxe's researchers had examined the entire printing process as a total system, including the treatment and disposal of its waste products. As a result, they developed an environmentally friendly ink and wash system that freed their printing plants from the burdens that drag down major VOC sources: costly treatment and capture as well as costly, time-consuming permitting, monitoring, and reporting. This new technology, named PrintWise, not only eliminated the rising environmental cost pressures on Deluxe's core business but created a new market opportunity for the company.

Management Makes Key Decisions

Deluxe's research and development efforts generated a new patented ink printing system that, for most applications, was equal or superior to conventional, polluting ink systems at the same time it eliminated significant and growing environmental compliance costs. The company's management now had to make some major decisions:

1. Should it bring PrintWise to market now while the product still had a few minor operating problems for some applications, or should it postpone market entry and continue R&D efforts until the product was equal or superior to conventional or soy-based inks for all applications?
2. When Deluxe finally did enter the market, should it manufacture the ink and solvent for its own use and market the product for sale to other printers, or should it license the technology to an existing ink manufacturer?
3. What pricing strategy should it employ?
4. Is there a larger strategic issue — in the future of paper checks vs. electronic systems — that Deluxe should be paying more attention to? This has environmental implications as well.

Deluxe management reasoned that the minor technical problems with its ink system were easily outweighed by the product's substantial environmental and worker health benefits. These benefits would yield lower costs to the customer even if Deluxe charged a higher price for PrintWise than for conventional inks.

Because of the company's earnings difficulties, management was feeling pressure from investors and was looking forward to the public relations benefit that would come with the announcement of PrintWise. Deluxe decided to go ahead with the announcement and product introduction while continuing to improve the product with further R&D. It also decided to charge a higher price for the product.

Deluxe management believed that PrintWise presented a huge opportunity. In 1992, United States ink manufacturers were responsible for 42% of the world's production of printing inks and had revenues of three billion dollars. Ninety eight percent of U.S. production went for domestic consumption. A good part of these revenues were for lithographic inks, and Deluxe hoped to capture a significant share of future sales.

With Deluxe's total revenues running in the \$1.5 billion range, sales of PrintWise would have a meaningful impact on the company's future earnings. Printing ink sales abroad were about \$4 billion and presented the company with an additional opportunity.

Deluxe management wanted to capture as much of these potential sales as possible, but they recognized the need for help from experienced ink manufacturers in order to fully realize this potential. A problem in finding a partner was that the ink manufacturers it dealt with were not doing very well financially. The manufacture of printing inks had become a commodity business: demand was sluggish, and prices were at profitless levels. Many ink manufacturers, therefore, were risk-averse and lacked the financial resources to buy and introduce an entirely new product that was untested in the marketplace. In addition, although the new product was proprietary and could command a premium price because of the cost savings promised, Deluxe wanted to capture part of that premium for itself in the form of license royalties.

On the other hand, if Deluxe Corporation chose to enter the ink and solvent manufacturing business itself, it would be doing so without any experience in this area. Even as a printer, Deluxe only used one process — coldset-web offset lithography — and knew next to nothing about other commonly used processes, such as heatset-web and sheetfed offset lithography. Moreover, entering the business would put Deluxe in direct competition with its existing suppliers, and it would be marketing the product to its existing competitors.

Given these structural problems, could the PrintWise ink system fetch the company's target price? Would entering the ink system manufacturing business lower the firm's overall margins and returns on investment?

The Company Seeks a Partner and the INK Division Is Created

Deluxe entered into negotiations with prospective partners with a certain amount of ambivalence. It sought a working relationship with an established ink manufacturer before building its first pilot manufacturing facility but was unsuccessful. Management did not offer a high enough share and asked too high a price to attract a buyer for an untried product.

Deluxe then built and successfully put into operation the pilot PrintWise production facility. It demonstrated that the ink could be efficiently manufactured and, by introducing it into its own printing facilities, that it worked well — at least for coldset-web applications.

Deluxe then tried again to find an established ink manufacturer as a minority partner and, again, was unsuccessful. A major Japanese ink manufacturer showed strong interest but was unwilling to enter into an agreement unless it had a 50% share of the investment.

Deluxe constructed its second PrintWise manufacturing plant on its own. The new plant was four or five times larger than the first. Deluxe now had the capacity to not only replace its conventional ink systems with the environmentally friendly PrintWise system for its own printing operations but also to begin marketing the product to others. The company created the INK Division.

Deluxe did not give up the idea of developing PrintWise worldwide. It continued to seek a joint venture with an established ink manufacturer. The firm had now greatly increased the ink and wash's credibility by demonstrating how they could be manufactured and used.

Printing inks were used for a variety of applications by offset-lithography printers. This resulted in demand for inks that were designed for particular applications. Deluxe would benefit from the technical as well as marketing expertise of a major ink manufacturer with an international presence.

Sales did not increase as quickly as expected in the United States. Printers proved less enthusiastic about PrintWise's environmental advantages than Deluxe hoped, and they were also less tolerant of its technical drawbacks. Now willing to offer a partner more attractive terms, Deluxe successfully established a relationship with the largest ink manufacturer in Europe: Coates Lorilleux Company, headquartered in Paris.

Coates had markets worldwide and gave PrintWise increased credibility with potential customers. Coates Lorilleux was very strong technically and provided valuable learning-curve experience to the production of the PrintWise system. It was licensed for exclusive marketing rights in Europe, South America, Africa, and Australia. It also was granted non-exclusive marketing rights for parts of the Far East.

The two companies also had a technology-sharing agreement. The PrintWise system was specifically designed for use with the new, non-polluting fountain solutions in widespread use in the U.S. Coates had to adjust the PrintWise system to the older isopropyl alcohol-based fountain solutions still predominant in European printing establishments and other parts of its marketing areas.

Pricing the PrintWise Product

After again considering how to price the product, Deluxe made the strategic decision to go 20% higher than market prices for petroleum-based inks. If it had exactly matched the prices of the conventional inks, margins would be too low to justify entering the business. PrintWise was a proprietary product with some distinct advantages that warranted a premium price, which was needed to satisfy the company's hurdle rate in order to make the investment.

Along with the ink, the PrintWise system included the environmentally friendly cleaning solution that Deluxe offered less than half the price of the toxic solvents required for cleaning conventional inks.

Most printers, however, used a lot more ink than solvent, so the impact of the low-cost wash on overall printing costs was small. In setting PrintWise system prices at this level, Deluxe marketers calculated that printers could expect to save as much as 20% by eliminating environmental regulation compliance costs.

PrintWise inks cost no more to manufacture than conventional inks, with one exception: ink formulated for heatset-web applications. The PrintWise heatset ink still contained 20% VOCs, but this was half the amount found in conventional, petroleum-based heatset inks. The materials needed to replace the VOCs in ordinary inks were more expensive than the ingredients used to produce heatset-web PrintWise ink.

Some Technical Problems to Overcome

Deluxe had been able to replace all of its inks with PrintWise except one: a specialty ink that it used in relatively small quantities. Company researchers were still working on this problem.

As far as performance was concerned, plant managers believed that, for their highest-volume jobs, the new ink system was superior, especially for coldset applications, the area of Deluxe's expertise. However, for certain heatset and sheetfed applications, PrintWise yielded an excellent printed product but took longer to set than conventional inks.

Unlike petroleum-based inks, Printwise Ink required the presses had to be adjusted more carefully. Deluxe had thought that printers would accept these problems in exchange for PrintWise's superior environmental performance, but printers didn't like having to worry about setting their presses just right.

Some printers were not complying with environmental regulations, but even those that did were reluctant to buy Deluxe's environmentally friendly product. They were unwilling to take the risks inherent in replacing their tried-and-true inks and solvents with a totally new system: production workers would have to learn how to use the new product, and presses would have to be specially adjusted. Was there time available to do all that? Many printing jobs had strict deadlines and short lead times.

PrintWise salespeople were finding that many printers would rather absorb the costs (and hassle) of environmental compliance than take any chances with a new product. Product improvement was needed before PrintWise would be competitive for all applications.

PrintWise Becomes a Superior Product

During PrintWise's first 18 months on the market, Deluxe researchers solved the last technical problems. At the same time, satisfied customers were providing valuable reports about the performance of this new ink system.

Deluxe now had a product equal or superior to conventional inks. Not only did PrintWise eliminate many environmental compliance requirements and costs and reduce workers' health concerns — its performance offered several advantages:

- PrintWise ink had greater "mileage" than other inks. That is, a pound of PrintWise ink printed 20-30% more material than competing inks. This made the Deluxe ink and wash system cheaper for printers to use even before including the savings generated from eliminating compliance costs!

- PrintWise inks were found to have excellent setting characteristics, making them at least a match for petroleum-based inks and superior to other vegetable oil-based inks where setting has been a problem. The chemistry responsible for making PrintWise ink washable with non-toxic solvents was also making the resin systems in the ink behave better than they did for petroleum or soy-based inks. As a consequence, since vegetable oil-based inks had superior color printing properties, PrintWise was outperforming conventional color inks color — without the slower setting time of other vegetable oil-based inks.
- PrintWise color ink reduced the startup time required for sheetfed color printing jobs by about 70%. This feature not only saved the printer valuable time but greatly reduced the waste generated during the startup printing period.

The Deluxe INK Division could now sell the PrintWise system with enthusiasm to a wide range of lithographers throughout the U.S. and Canada. Experience had taught Deluxe how effective the team approach was in selling a new technology. PrintWise salespeople would

call on management at prospective customer sites while technical advisors — experienced pressmen who had used PrintWise at Deluxe — visited the pressmen on the plant floor and demonstrated how well the system worked and how much safer it was. The enthusiastic response from the pressmen greatly helped the sale.

After a slow start and with its ink manufacturing facility running at only 50% capacity, Deluxe finally reached the product's successful takeoff point. The word of PrintWise's attractive features was getting around, and demand for the product was accelerating.

Deluxe Announces a Restructuring

Even with Printwise's successes, Deluxe was plagued by continuing disappointments over quarterly earnings and a stock price that failed to participate in the bull market for equities. So Management announced a restructuring of the company. Deluxe would cut costs, closing more check-printing plants and refocusing on its core competencies. What should the company do with its PrintWise operation?

Appendix

(Excerpted from Deluxe's 10K, filed with the SEC in 1995 — see www.sec.gov/cgi-bin/srch-edgar for complete report.)

The Company has four business divisions.

1. Payment Systems, which consists of:

- Deluxe's check and financial form printing and plastic transaction card production units
- Deluxe Data Systems, Inc., (including Deluxe Data International Limited), a supplier of software and processing services for automated teller machines, point-of-sale systems, automated clearing houses and government benefit transfers
- Chex Systems, Inc., a checking account verification business serving financial institutions
- Electronic Transaction Corporation, a database management business providing check authorization information to retailers
- National Revenue Corporation, a provider of collection and other accounts receivable services to retail, financial and medical credit grantors
- Financial Alliance Processing Services, Inc., a processor of electronic credit and debit transactions

2. Business Systems, which consists of:

- Deluxe's general business and health care forms printing unit
- Deluxe UK, Limited, and Deluxe Canada, Inc.
- PaperDirect, Inc., a direct mail marketer of specialty and decorated papers for desktop publishers
- Nelco, Inc., a supplier of tax forms, tax forms software, and electronic tax filing services
- T/Maker Company, a publisher of image content software, including clip art

3. Consumer Specialty Products: Current, Inc., a direct mail marketer of greeting cards, stationery, bank checks and related consumer/household specialty products.

4. Ink, Deluxe Corporation's ink division, which manufactures and sells water-washable lithographic ink and solvent free press wash.

Except for a small but growing volume of business form and decorated paper sales in the U.K. and Canada and licenses of electronic funds transfer software in selected European and Asian countries, most of Deluxe's products and services are sold in the U.S.

Payment Systems

The Company's largest division, Payment Systems is composed of the paper-based payments unit and the electronic payments unit. The former prints and sells to financial institutions and depositors a variety of checks and related banking forms. It directs its efforts to the production and marketing of checks and deposit tickets for personal and business accounts. Several check styles are offered; some are designed for desk or office use, others to be carried in a pocket or purse.

Substantially all of the Company's checks and related banking forms are imprinted with magnetic ink to conform with the specifications of the magnetic ink character recognition (MICR) program currently utilized by the U.S. banking system.

For several years the banking industry and others have been seeking ways to improve the payment system, and a variety of alternatives to the bank check have been introduced, including charge cards, credit cards, debit cards, bill payment by telephone, etc.. In addition, a number of printers have begun to market checks through channels other than financial institutions. Although such alternative means of settling financial transactions and alternative marketing channels may reduce the demand for checks and checks obtained through financial institutions, the Company is unable to predict the effect of these alternative means of payment and channels of distribution on its future operations.

Depositors commonly submit initial check orders and reorders to their financial institutions which forward them to one of the Company's printing plants. Printed checks are sent directly by the Company to the depositors, typically on the business day after receipt of the order. The Company's charges are paid by the financial institutions, which in turn usually deduct the charges from the depositors' accounts.

Skeleton check forms are lithographed in three of the Company's regional warehouse and distribution centers, principally on high-speed roll-fed presses. From these centers, the forms are distributed to the Company's 46 check production plants, where names, addresses, financial institution name and other information are printed on the documents. The Company's facilities are located in major metropolitan areas throughout the U.S.

The Company's primary competitors in the sale of bank checks and related banking forms to financial institutions are two other large national printers who specialize

in check printing. However, any printer who complies with the American Bankers Association's specifications for MICR printing is a potential competitor. The Company is the largest firm engaged in check printing.

The electronic payments unit is a major supplier of electronic funds transfer software and processing services, particularly software and services for automated teller machines, processing of ATM interchange transactions within and between regional shared networks, and electronic benefit transactions. The Company provides ATM transaction processing technology and services to six of the 10 largest ATM networks in the United States. The Company provides electronic benefit transaction services for the automated payment of aid to dependent children and food stamp benefits in Maryland and New Jersey.

Competition for the Company's electronic funds transfer software/processing services comes from several large financial institutions and communications companies.

Business Systems

The second largest of the Company's divisions, Business Systems directs its efforts to the production and marketing of short-run computer and business forms and record-keeping systems for small businesses and professional practices. In addition, it is a direct mail marketer of decorated and other specialty papers to users of laser printers and office copiers. Other products and services marketed by the division include tax forms, tax forms software, one-write accounting systems, and electronic tax filing services.

Business Systems' products are sold primarily through direct mail and check package advertisements. Business Systems' computer and business forms are produced or inventoried in nine of the Company's plants, and its specialty papers are inventoried and shipped from a PaperDirect facility in Secaucus, New Jersey. Business Systems' principal competition consists of a large number of national and local business forms and office products suppliers.

Consumer Specialty Products

This division produces and markets greeting cards, gift wrap, bank checks, and miscellaneous stationery products. In addition, it markets a variety of novelty items for household use, many of which have been

created by the division and are sold under its proprietary trademarks. All such products are sold to consumers by means of catalogs and other direct mail advertisements. Many of the division's promotions are based on holidays, and due to the significance of the year-end holiday season, approximately 35 percent of the division's sales occur in the fourth quarter.

Ink

In June 1994, the Company formed the Ink Division to produce and market its water-washable lithographic ink and solvent-free press wash system. The Company's innovative ink meets or exceeds the performance standards of conventional lithographic inks, requires no press modifications and is based entirely on renewable vegetable oils. The ink system eliminates the need for organic- or petroleum-based cleaning solvents which are a major source of pollution. On November 21, 1994, the Company entered into an agreement with Coates Lorilleux S.A. under which it licensed Coates to manufacture and distribute the ink and solvent-free press wash system in Europe and in certain other markets.

1994 Annual Report to Shareholders — Financial Highlights

(Dollars in Thousands Except per Share Amounts)

	<u>1994</u>	<u>1993</u>	<u>Change</u>
Net sales	\$1,747,920	\$1,581,767	10.5%
Net income	140,866	141,861	(.7%)
Ret. on sales	8.1%	9.0%	
Per share	1.71	1.71	
Ret. on avg. shareholders' equity	17.4%	17.4%	
Cash dividends paid	120,503	117,945	2.2%
Per share	1.46	1.42	2.8%
Shareholders' equity	814,393	801,249	1.6%
Book value per share	9.89	9.66	2.4%
Avg. com. shrs. outstdg. (thous.)	82,400	82,936	
Number of shareholders	22,436	23,084	
Number of employees	18,903	17,748	6.5%

<u>Net Sales</u> (Millions)	<u>Net Income per Share</u> (Dollars)	<u>Cash Dividends per Share</u> (Dollars)
1994 \$1,748	1994 \$1.71	1994 \$1.46
1993 \$1,582	1993 \$1.71	1993 \$1.42
1992 \$1,534	1992 \$2.42	1992 \$1.34
1991 \$1,474	1991 \$2.18	1991 \$1.22
1990 \$1,414	1990 \$2.03	1990 \$1.10

Discussion Questions

- 1.What do you think are some of the important lessons to be learned from Deluxe's experience in managing the introduction of this product?
- 2.Put yourselves in Deluxe management shoes. What decisions should it make given its financial difficulties and the promising-yet-unproven capabilities of its new ink system to deliver profits? Was this new ink system part of the company's core competence?
- 3.Should Deluxe's try to sell PrintWise, or license the technology to someone else who was in a better position to capitalize on its potential? Share your reasoning. Can you give an example of any other company that has been able to successfully launch a new product that was so far afield from its core competencies? What problems with PrintWise did Deluxe encounter that could be largely attributed to the fact that ink manufacturing was outside of the company's core?
- 4.If you decide that Deluxe should keep the PrintWise product, how should it price and market it? Develop a simple economic model to estimate margins. Assume a dollar of capital (including working capital) generates a dollar of revenues and depreciates over 10 years. Take gross margins to be 50% when PrintWise is priced at a 20% premium.



Deluxe Case Teaching Note

Key Discussion Point

The key discussion point here is what can be done by Deluxe to better market and make Printwise profitable and whether Deluxe has the core competencies and will to risk the company's future with this type of departure in its historical businesses, given pressures from financial markets. (Note: To better separate business issues from technical ones, you may wish to have your students read and discuss the first half of the case before continuing on with the second half.)

What Eventually Happened

The instructor should be aware at the outset that Deluxe did decide to sell Printwise to SICPA Industries. The May 1996 announcement said that SICPA would become the exclusive supplier of Printwise to Deluxe, which would continue to use Printwise to print its checks and other products. SICPA is the world's leading security ink manufacturer. It was committed to improving and expanding the Printwise technology.

Deluxe thought it had gone about as far as it could in the development and marketing of Printwise, but students might want to contest that decision. This would be a good place to start a discussion about the migration of environmental product competencies from company to company until they find a good home. From an environmental perspective, society's concern is not that one company profit from an environmentally friendly product but that the product find the best home possible for its future growth and development.

Foreign Firm Buys Rights to Printwise

SICPA was a subsidiary of a Swiss Holding Company. The fact that it is a foreign company may lead to a discussion of whether foreign, specifically European, companies have more appreciation for the potential of environmentally friendly products and more tolerance for the risks inherent in their marketing because of the different nature of consumers and consumerism in the advanced industrial nations of Europe.

Did Deluxe Reach Its Limits in What It Could Do With Printwise?

SICPA is a developer and manufacturer of security inks that are used in most of the world's currencies and documents of value. SICPA is skilled at developing inks that make documents and branded products resistant to tampering, forgery, or alteration. Deluxe did not intentionally develop expertise in inks except insofar as it was a user of inks who faced environmental challenges. The discovery and development of Printwise was almost accidental, and it appears as if Deluxe went as far with this product as its capabilities allowed.

Printwise's Environmentally Friendly Features. In reviewing the case with students, enumerate Printwise's environmental friendly features. It is a water-washable lithographic ink that Deluxe started to use in its own printing plants in late 1993. It reduced Deluxe's volatile organic compound emissions by more than 50 percent. It was recognized by environmental, government, and industry groups as a viable alternative to conventional lithographic inks. It promised easier environmental compliance, improved work conditions through reduced

use of solvents, reduced liability costs for hazardous waste storage and disposal, and improved product positioning in response to consumer demands for environmentally friendly products. However, are corporations set up in their accounting and other systems to factor in these largely intangible costs? What kind of burden do these types of benefits put on a sales force that is trying to promote this product?

From Where Does Innovation Come? It is interesting that this innovation, like many, came from users of ink products, not manufacturers and distributors such as SICPA, which one would think had the expertise. Much innovation, or at least the incentive for it, comes from users rather than suppliers, who may be perfectly happy to continue selling conventional products. Users also may have better understanding of connections between systems — the inks and the solvents used to wipe-off excess ink — than suppliers.

Finding an Appropriate Partner. One can speculate that the development of Printwise may have been even more successful if Deluxe had developed earlier and stronger ties with suppliers. A key part of the case is the section on Deluxe's search for a partner after the INK division was created. Had it been more successful in that search, a good question to ask is, would it have been as necessary to sell the division to another company? Try to get your students to discuss the structural aspects of the industry to highlight when a user can expect supplier cooperation or apathy.

Pricing. Another key issue has to do with the pricing of Printwise. Had Deluxe priced it differently, would it have been more profitable? How much leeway did Deluxe have on pricing? Is it ever possible to market an environmentally friendly product at a premium price, or were there peculiar technical limitations (at least in the perception of users) that made it difficult to price this product at a premium?

Technical Issues. Finally, there were the irksome technical issues. These exist in the development of any new product, but did Deluxe, with its lack of experience and expertise in developing new inks, handle these technical issues appropriately? What did it do to assure consumers? How did it help alleviate their fears about the uncertainties associated with the product? For the printers who would have to buy this product, performance was critical. Deluxe must have understood this issue, but did it handle it correctly? Before any consumer would be ready to enjoy the environmental benefits, he or she had to feel that performance requirements were satisfied.

How Deluxe Could Approach the Marketing Issue. This type of discussion is a very useful one to have with students. With inks (as with many products), often it is customers who are the specifiers of product requirements. Working with the customers who bought the print jobs was a critical part of what Deluxe had to do. If these customers of the printers demand an environmentally friendly ink, there was much greater likelihood that the printers would use it, even if the price was higher and the technical application new.

Product Legitimacy. The printers themselves often were small shops working in a fiercely competitive industry where there were exacting standards and very low margins. In short, the printing industry is not one where one could expect much innovation from the individual printers, especially when the source of that innovation was a large company that was a potential competitor. Beyond customers as specifiers, a marketing campaign might have to start with industry trade associations, which in essence could endorse the product for wide distribution so that the industry as a whole could gain reputational advantage and no individual company would have to take the risks of adoption or bear the burden of product failure. Other legitimizing bodies were the government and environmental groups which could confer intangible benefits on the printers for their adoption of Printwise.



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The mission of the NPPC is to promote sustainable development by educating students, faculty, and professionals about pollution prevention; create educational materials; provide tools and strategies for addressing relevant environmental problems; and establish a national network of pollution prevention educators.

In addition to developing educational materials and conducting research, the NPPC also offers an internship program, professional education and training, and conferences.

The NPPC provides information on its programs and educational materials through the Internet's Worldwide Web; our URL is <http://www.umich.edu/~nppcpub/> Please contact us if you have comments about our online resources or suggestions for publicizing our materials through the Internet. Thank you!