

10.09 Executive White Paper

Electronic Shelf Labels

Retailers first began testing electronic shelf labels in the late 1980s, but as the first decade of the new millennium draws to a close, they have yet to find a wide audience in the United States.

This white paper will attempt to explore the history, benefits and risks of Electronic Shelf Labels (ESLs), while making some predictions about when they might show up at a store near you, and what you should consider when evaluating their benefits and drawbacks.

This White Paper, prepared by Vestcom International, Inc., offers insight into the evolution of Electronic Shelf Labels (ESLs) and highlights the potential benefits and risks of existing ESL technology and key considerations for evaluating this label technology and its impact on shelf-edge marketing.





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- 1. Background**
- 2. Overview**
- 3. Technology**
- 4. Benefits**
- 5. Drawbacks**
- 6. Shelf Edge Marketing**
- 7. Conclusion**

ESLs are just what they sound like: digital labels that give shoppers price and item information. They take the place of the familiar paper or vinyl labels at the shelf edge beneath products. Although ESLs have been around since the late 1980s, they didn't really begin to get noticed as an alternative to paper or vinyl price labels until about 1995. At that time, the two leading providers were NCR and ERS (Electronic Retailing Systems). ERS holds numerous patents for electronic shelf labels and the network structure needed to make them work.

Around the same time, numerous retailers were announcing installations of ESLs in certain stores. None of those has resulted in a full rollout however, for reasons that will be discussed later in this paper.

Despite the lack of broad acceptance, there is little doubt that ESLs are coming; it's a matter of when, not if. Testing in the U.S. continues, with higher stakes and more focus on real benefits. ESLs have made significant inroads in other parts of the world; e.g., Europe, the Middle East and Africa account for 68 percent of the global market, followed by the Asia Pacific region's 25 percent.

The general consensus is that one major U. S. retailer will make the leap to ESLs, probably within the next three to five years, and initiate a chain-wide deployment. From that point, acceptance and rollout will grow exponentially. A recent poll in *Progressive Grocer* suggests that 28 percent of independent grocers see ESLs as one of the most important technologies in the next three years.

Technology is pervasive in the world of retail, as is the case with so many labor-intensive industries. Acceptance of technology is never as fast as expected when new applications become available, but once acceptance occurs, then ramp-up and proliferation happens much faster than expected.

The U.S. currently has the lowest penetration of ESLs of any developed nation, but once acceptance by both retailers and shoppers is attained, growth—as is so often the case—will be explosive.

2. Overview



The benefits of ESLs are immediately apparent, even for those not familiar with typical store operations. The two greatest—and most frequently touted—benefits are labor savings and price accuracy. The two most common downside factors are initial cost and overall effectiveness, which encompasses a number of factors that we will cover shortly.

The display technology for ESLs is generally liquid crystal display (LCD), although some of the newer executions are using electronic ink displays, which are most commonly found today in e-reader devices, such as the Amazon Kindle. The advantage of electronic ink displays is their low power use; current is only drawn when the screen changes, which equates to increased battery life.

The labels connect to a store-wide network that uses various methods to communicate with the labels. The network taps into the store's point of sale (POS) system and it downloads prices to the labels as directed. This can be initiated at the store, or even from a corporate location for numerous store locations. Because no physical changes are necessary, changes can be made as needed without added labor or time.

ESLs are built on one of three wireless communications technologies: Infrared (IR), radio frequency (RF), and visible light technology (VLT). All have benefits and drawbacks as methods for communicating with the tags at the shelf.

- Infrared does not compete with the current plethora of in-store radio frequencies, but it requires line of sight from numerous transceivers throughout the store and won't penetrate walls.
- Radio frequency has a lower cost and does not require a direct line of sight, but it also requires additional transceivers and may conflict with other radio signals in the store.
- Visible light technology uses existing lights in the store to communicate and requires no other installation once the lighting system is set up. This method is significantly more expensive than other options and has yet to find a broad audience anywhere.

In addition to the method of communication, there are also a number of display technology options for ESLs. The most popular method is the standard LCD, accounting for more than 94 percent of the market. But restrictions in the ability to include graphics and the technology's relatively high power consumption have promoted interest and development of alternative technologies. Two examples of alternatives are the following:

- Electronic ink display, or electronic paper, is most like print, using alternately charged white and black particles to form patterns. While its very low power use is attractive, the additional up-front investment adds to the return on investment (ROI) payback time.
- Organic light-emitting diodes are quicker than LCDs and require no backlighting, but this is still a developing technology with higher costs than LCDs or electronic paper.

4. Benefits



ESLs historically have two primary benefits that retail operators find attractive: reduced labor and increased price accuracy at the shelf. The major impetus for ESLs has always been to find an alternative to the labor-intensive process of changing prices on an average of 6,000 – 8,000 items per week in each store.

Growing labor costs and local weights and measures departments looking for ways to raise revenue have continued to put pressure on this area of operations, and it's no wonder that ESLs are seen as possibly the greatest single change for stores since the checkout scanner.

Because ESLs get information directly from the store's POS system, there is virtually no chance that the price at the shelf won't match the scanned price when the customer checks out. And because it's all done electronically, changes are instantaneous, requiring no additional store labor.

While cost to implement is a factor, there is a positive ROI to be had. Current average cost per label is about \$5; so for a store with 45,000 items, there is an initial cost of \$225,000 for the labels. Adding in the cost of installation and networking, and the total will rise to about \$250,000.

If that same store has two price coordinators who work 40 hours per week, at a fully-loaded \$20 per hour, that's about \$83,000 per year, if the store can save all those hours. That equates to a break-even of about three years from installation. Not bad, assuming an average battery life of five years or before any other maintenance is needed.

Price accuracy is another benefit; no longer does the store manager need to be concerned with whether all the tags were hung, or that an item that came off TPR didn't get the new price label. The laws carried by most states that give an incorrectly labeled item to a customer will be obsolete.

ESLs can also have multiple "screens" that can provide additional information to shoppers via a touch interface (generally a small button on the front). This could include nutrition information, price-per-measure, or even recipe ideas.

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In addition, there's the ability to change prices as needed for competitive reasons, or to capitalize on day-parts. Slower days could have lower prices, or prices can be raised at halftime for football fans running out to refill the cooler. No one is really talking about this, but there is little doubt that it's crossed the minds of store operators.

The evolving technology behind ESLs is now allowing them to be tied into other beneficial technology for retailers. For example, temperature sensors can be part of the package, allowing remote monitoring of temps in critical areas like dairy cases and freezer sections.

Inventory monitoring capabilities are also in development, which would allow stores to keep track of which items are out of stock, or running low, at the shelf. A tie-in to point-of-sale would allow generation of automatic inventory reports, which allows personnel to track and eliminate out-of-stocks, a major area of opportunity for virtually all retailers.

5. Drawbacks



While the ROI for the purchase and installation of ESLs seems viable for a single store, large chains face a different situation. For example, a chain that has 300 stores faces an initial outlay of \$75 million. Even for a chain with \$3 billion in annual revenue, that is cause for consideration.

There is also the question of longevity; how long will the tags really last in a real-world environment? Supermarkets present significant challenges to technology, requiring extreme durability for those items that are vulnerable to carts and kids. One can imagine the damage that could be done by one loose child with a cart charging down the cereal aisle, shearing labels off as he goes.

Many stores have found in the course of testing that the labels can be difficult to read, especially for older patrons, and for those labels on the bottom couple of shelves. Also, size can be a problem for certain items with small packages and only one facing, like supplements. These require a smaller tag (exacerbating the hard-to-read aspect), or a traditional printed label.

Some municipalities have gotten into the discussion as well, contending that changing to ESLs has no direct consumer benefit. Despite arguments that lower labor costs lead to lower prices, suspicion is still rampant about the true benefits of ESLs. This is much like the backlash when checkout scanners were introduced 30 years ago; local governments and consumer groups fought back with everything from additional laws to pickets.

Beyond the practical limitations of ESLs, there is a greater concern that should be evaluated when considering whether to go with the technology.

When ESLs were initially conceived some 25 years ago, virtually all retailers were using monochrome labels, black print for example, displaying price, package size and a stock number, and maybe the cost-per-measure. Any additional promotional messaging was put on the shelf as a shelf talker, or some other extra sign, to draw attention to the product. The problem was that shelf talkers and signs added labor and had a tendency to get knocked down.

Since then, even as interest in ESLs grew, printing technology allowed for the use of full digital color on shelf labels at an affordable price. Following that, variable digital color became available, which allowed for custom messages, by store, on each label. Labels got a little larger, much more colorful, and exponentially more effective. These advances took the place of the traditional shelf talker, allowing incremental messaging to be placed reliably at the product without additional labor.

Today, custom digital color labels can be printed and sent to stores, in planogram order, with turn times of under 36 hours from the time the price file is sent until the labels hit the store. They have proven results for driving sales, and they improve the overall shopping experience while making existing marketing programs more effective by tying messaging back to the shelf.

Meanwhile, ESLs continue to evolve, with the primary goal of reducing cost per label. While monochrome ESLs have gotten down to the \$5 each range, the cost of color is significantly higher, and by most estimates, not ready for prime time due to its poor quality.

The result of this is a digital shelf label developed to meet the needs of retailers 25 years ago. For retailers who have embraced printed variable digital color labels, and enjoyed the sales growth they provide, ESLs are not a viable option, even with the added benefits of reduced labor and pricing accuracy. This will continue to be the case until color ESLs drop in price and improve in quality.

Marketing messages at the shelf remain a challenge with ESLs because of the consistency of the tag (it's hard to make anything stand out), and the relatively muted color options available. While event-driven or time-driven promotional pricing is a viable option, getting that message noticed at the shelf is much more challenging than when using traditional printed labels.

This is especially noticeable in today's world of shopper marketing, which has focused on the shelf edge not just as a place for price, but as an effective marketing tool that uses the most valuable real estate in the store to engage and influence shoppers.

7. Conclusion



There is little doubt that ESLs will be with us in the near future. Within three to five years predictions indicate we will see at least one major retailer commit to a full-blown installation. Only then will the true benefits and drawbacks be apparent, but that commitment will result in other solutions that address the most critical areas of concern.

From that initial installation, more retailers will join the ranks looking for labor savings and pricing accuracy. But the need for at-shelf marketing will remain; indeed, it will likely become more important as a differentiator and a way to improve the shopping experience.

Vestcom is actively engaged in the ongoing development of ESLs; not to prevent or hinder their development, but to ensure that options exist for retailers wishing to combine the practical benefits of ESLs while maximizing their ability to market from the shelf edge.

Vestcom International is the leading provider of customized shelf-edge communications and specialized marketing services for the retail industry, driving more sales by connecting marketing and merchandising at the shelf for the nation's top retailers and their suppliers. To find out how Vestcom can help your retail operation answer the demand for in-store solutions that reduce costs and increase sales, please contact us today for a no-obligation analysis and quote.