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WHERE HAVE ALL THE ON-LINE GROCERS GONE? LESSONS LEARNED FROM THE DEMISE OF ON-LINE GROCERS

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Online grocer Webvan Group, Inc., fired a salvo across the shopping carts of the brick-and-mortar supermarket industry when it announced that within two years it would be delivering Web ordered groceries free-of-charge in 26 major markets throughout the United States (Dembeck, 1999).

~ July 14, 1999

Webvan Joins List of Dot.Com Failures: Online Grocer Burned Up \$830 Million Since 1999 (Mangalindan, 2001).

~ July 10, 2001

ABSTRACT

The grocery concept has evolved over many years to drive cost out of the process. Grocery margins are very thin, typically ranging from 1% to 1 ½% such that the grocery business continues to look for innovative ways to take cost out of the process. Ordering groceries on the Internet was initially thought to be a very promising new opportunity. So what happened to on-line grocers? This paper considers what went right and what went wrong for the on-line grocers and uncovers a few logistics lessons along the way.

THE CHANGING FACE OF THE GROCERY INDUSTRY

The grocery concept has evolved over many years to drive cost out of the process. Consider how the frontier store, where the customer gave the storeowner a shopping list and he personally picked out the groceries from his shelves, gave way to the invention of the shopping cart in 1936 (Wilson 1978) and the concept of allowing multiple customers to roam the store to pick out their own groceries. Not only did it lower cost but it allowed the grocery to handle more customers at the same time. The concept has been incorporated in virtually all the current models of grocery retailing from the convenience store to traditional grocery store to warehouse club. All have the common element of customer pick. Today, Walmart, with 2,941 stores, owns 1.6 million shopping carts where up to 550 carts are used at any given time (Cahill, 1999).

According to industry statistics, the average supermarket's labor expense is currently about 12 percent of sales. Of the labor expense, it is estimated that grocery stocking expense is about 10 percent of its labor expense, or 1.2 percent of sales (Anonymous, 1999). Grocery margins are very thin, typically ranging from 1% to 1 1/2%. The grocery business continues to look for innovative ways to take cost out of the process. For example, in the distribution process of the typical traditional supermarket, a can of tuna changes hands on average 14 times between the food-packing factory and the customer's can opener. Software, networks and warehouse automation can reduce the tuna can's turnover to 11 pairs of hands or fewer. This leads to lower costs, and, if not completely passed on to the consumer, to higher margins (Anonymous, 2000).

Ordering groceries on the Internet was initially thought to be a very promising new method to lower cost. People generally want convenience, time- and labor-saving approaches, especially in two-worker households where there's little time for leisurely shopping. So if price, ordering, quality, freshness and delivery are the same with an Internet grocer, why not—some would

say—bypass the traditional grocery store and the need to traverse long aisles, line up at the checkout, and all that hassle (Sleeper, 1999)?

Dot.com grocers were formed anticipating that information flow would be a means of driving cost out of the process and increasing margins. Table 1 shows a comparison of the typical supermarket and an on-line grocery delivery model utilized by Streamline to support that claim. A 1998 study by Andersen Consulting predicted that the number of households buying groceries on-line would reach 15 million by 2007 (Santous 1998). Forrester Research estimated that on-line grocery shopping in the United States would grow from \$509 million in 1999 to \$10.3 billion in 2004. Progressive Grocer (2001) estimates the overall grocery industry in the U.S. to be \$494 billion, suggesting the on-line grocery share would grow from 0.1% to 2.1%.

**TABLE 1
STREAMLINE VS. TYPICAL
SUPERMARKETS**

	Typical Supermarket*	Streamline
Cost of Goods Sold	75%	72%
Operating Costs	17%	13%
Distribution	4%	6%
Corporate Overhead	3%	3%
Net Profit	1%	6%

* Figures compiled by Smart Store, a research and development initiative at Anderson Consulting (Hannu and Tanskanen 2001).

So what happened to on-line grocers? The most telling quote came from a *Morningstar* newsletter.

Peapod...reminds me of the guy who wants to increase his income, and takes

TABLE 2
FINANCIAL RESULTS FROM PUBLICLY-TRADED ON-LINE GROCERS

	2Q '01	1Q '01	4Q '00	3Q '00	2Q '00	1Q '00	1999	1998	1997	1996
Streamline										
Revenue					8.86	8.46	15.38	6.95		
Loss					-11.45	-11.72	-19.50	-11.37		
Peapod										
Revenue		25.27	23.73	21.79	22.73	24.91	73.13	69.27	59.61	29.17
Loss		-15.45	-23.83	-9.80	-10.39	-12.74	-28.45	-21.57	-12.98	-9.57
WebVan										
Revenue		77.23	84.19	52.06	28.30	16.27	13.31			
Loss		-216.97	-173.14	-147.97	-74.37	-57.82	-144.57	-12.00		

out an ad offering \$1.20 in return for every \$1 bill he receives. To be sure, he'll get a lot of \$1 bills— his revenues, so to speak. The drawback is that he loses \$0.20 on each one (Kelly, 1999).

As of this writing the financial markets for on-line grocers have been devastated. Publicly traded on-line grocers have closed their doors. Others never reached their anticipated IPO. Table 2 reflects the financial results of the three largest publicly traded on-line grocers. Streamline and Webvan dissolved, and Peapod sold its remaining assets to Ahold NV. Another on-line firm, GroceryWorks, never reached the IPO stage, but sold its remaining assets to Tesco. This article considers what went right and what went wrong for the on-line grocers.

THE VIRTUAL SUPERMARKET

The definition of a Virtual Supermarket or on-line grocer is a store that sells directly to end consumers a full range of grocery products (for example, fresh and frozen food, toiletry, etc.). Customer orders are received through the Internet and picked by shopping personnel or robots. The ordered groceries can be delivered to consumers or can be picked up at a customer collection point. The system is complemented by "back-office" procedures that take care of

processing customer orders, inventory, payments, and distribution (Anonymous 2000).

FULFILLMENT MODELS

There were two types of facilities in use; in-store fulfillment centers (SFC) and dedicated fulfillment centers (DFC) (Anonymous, 1999). If the process has low volume, a SFC was the likely choice. The target market and desired products also may have dictated using a SFC. For example, a SFC seems to be appropriate for speciality and small store operations. If volume grows, then moving from a SFC to a DFC is in order. If the objective was to enter into a new geographical territory, or if the company was very optimistic about demand, a DFC was most likely implemented because of its anticipated cost and efficiency benefits (Anonymous, 1999).

It is in terms of fulfillment efficiencies that the models really differ. While Peapod and Tesco fulfilled orders out of actual stores, Streamline, Homerun, WebVan, and GroceryWorks relied on DFCs to process orders (Mathews, 1997).

In-Store Fulfillment (SFC) Model

The store pick model was pioneered by Peapod, which tapped into the existing logistics infrastructure, utilizing the retail store as the

end distribution point. All they did was bridge the gap between store and home, and charge a premium for the service (Casper 1998). In its early days as a Chicago-area start-up, Peapod fulfilled orders by picking items from the shelf of a local Jewel grocery chain. Unfortunately, this method lost Peapod money. So, as Peapod expanded into other markets and increase volume, it switched to establishing its own distribution centers, another money losing strategy (Holst 2001). Peapod's delivery costs averaged about \$12 per order. Recall from Table 1 that the typical supermarket's distribution costs run about 6%. A typical Peapod customer would spend \$120 per order (Lindsay, 1999) and was charged a \$4.95 flat monthly fee, \$4.95 per order and 5% of the total order. (Leibs, 1997) so the additional cost per order averaged \$13.42 or about 11.2%.

Peapod returned to the SFC model when it aligned itself with Royal Ahold to receive much-needed cash to continue operations. Peapod now uses existing Royal Ahold stores, such as Stop & Shop and Giant, for its inventory. It's a model similar to that employed by Tesco, the U.K. grocery giant that took a 35 percent stake in Safeway's GroceryWorks.com. It is likely Tesco will convert the GroceryWorks operations to the SFC model. Putting itself under the aegis of a brick-and-mortar grocer may help Peapod reduce marketing costs. Webvan spent between 25 and 35 percent of its revenue on advertising, compared with about 1 percent for traditional grocery chains (Moore, 2001).

Dedicated Fulfillment Center (DFC) Model

The warehouse/depot model seeks to create its own efficient home delivery infrastructure. It takes the retail store out of the cost structure, delivering directly from the warehouse, and affords the opportunity to consolidate delivery of multiple product classes as well as services to the home, while creating a lower cost structure

(Casper, 1998). A typical Webvan warehouse cost \$30 million to build (Moore, 2001).

Streamline had the most innovative approach to fulfillment using a DFC. A setup team was dispatched to a customer's house where the contents of the kitchen were scanned to create a personal shopping list, which typically accounted for 70% to 75% of a family's weekly order. A delivery day was determined. The family was given a UPC code list as its core shopping list, plus another list of the products and services available through Streamline. To order, family members checked off from their core list and the additional services list to determine their weekly needs, which may include video rentals, dry cleaning and bottled water, among others. As long as the order was placed by midnight, delivery would take place by 6 p.m. the next day (Liebeck, 1997b).

The heart of the Streamline system was the Streamline "box." This was a combination refrigerator, freezer/dry storage cabinet measuring five feet wide by five feet high by two feet deep that was placed in the customers' garage at no charge. The company operated a fleet of trucks that had three different temperature zones to maintain the integrity of the products (Liebeck, 1997a) and make weekly deliveries to the box. The customer did not have to be present for delivery to take place.

To support their delivery model, Streamline built a 56,000-square-foot distribution center in Westwood, Massachusetts, with about 10,000 different items in regular stock (by comparison, the typical supermarket carries about 30,000) (Leibs, 1997). Streamline customers paid a box installation charge of \$39 and a monthly fee of \$30 (Mathews, 1997). The average Streamline customer ordered goods 47 out of 52 times per year and spent an average of \$100 per week, or about \$5,200 per year (Liebeck, 1997a). The customer spent approximately 7.7% of the purchases on installation and monthly fees.

ALTERNATIVE FULFILLMENT APPROACHES

Another model, exemplified by NetGrocer, more closely approached the electronic commerce initiatives seen in other industries by outsourcing the delivery function to FedEx. It offered convenient ordering over the Internet, but delivery service was slower than the other alternatives (Casper, 1998). Netgrocer delivered to 49 continental states, as well as APO/FPO and Diplomatic Pouch zip codes (Anonymous, 2001). It offered 2,500 SKUs of only non-perishable groceries for a delivery cost of \$2.99 for the first 10 pounds and 99 cents per every additional 10 pounds. (Liebeck, 1997b).

Webhouse Club, a subsidiary of Priceline.com, had buyers log on and bid for items using four pre-selected discounts of up to 50% on 150 grocery items. Customers selected from two brands for each item and could not rank preferences. Customers had to accept Priceline's specified quantities and the chances of having a bid accepted were greater if they bid higher. The results appeared within 60 seconds. Customers paid on-line using a credit card and then printed out a prepaid list. The customer then had to go to any of a number of supermarkets from Philadelphia to Connecticut to pick up the groceries. (Setton, 2000).

The most successful model to date involves an existing grocery chain with a strong market presence that develops its own on-line ordering system and uses its own stores as the warehouse. United Kingdom grocer Tesco was the company that "cracked the code," by discovering that if it rolled out small, by sending just two trucks to the right store, its on-line operation could be profitable (Mahoney, 2001). Tesco says it operates the largest and most successful Internet-based grocery home shopping service in the world with almost 1 million registered customers and processing over 70,000 orders each week. It is profitable with sales of about \$420 million a year. (Macaluso, 2001).

BASICS BEHIND GROCERY LOGISTICS

Consider what the on-line grocers are up against. They deal with a relatively low order value (around \$100), low margins (1%-1½%), frequent replenishment, short shelf life with meat, produce, and dairy products, all shapes and sizes, different strategies regarding depth (defined as the number of different products in a line) versus width (defined as the number of product lines offered), a compressed delivery window and restrictions as to when the customer is available, varying picking costs, and specialized storage and transportation needs.

Quality control is a critical factor. Assume an on-line grocer with sales of \$50 million has an average order size of \$100. Also, assume the order consists of 50 items. This would require 25 million picking transactions across 500,000 orders. If a company were able to achieve a picking accuracy of 99.5%, one in four orders would contain an error, clearly an unacceptable rate from the consumer perspective, especially with "time-starved" consumers looking for less stress (Beech, 1997).

Streamline tried to capitalize on the trade-off between higher transportation costs and lower real estate costs. Streamline's DFC had real estate costs of about \$6.50 per square foot vs. the supermarket's typical \$18 to \$24 per square foot. Of course, it could be argued that SFC models have no real estate investment since it functions inside existing retail units (Mathews, 1997).

CONSUMER BEHAVIOR REASONS ON- LINE GROCERY WILL NOT WORK

An October 1999 survey by Fast Company revealed significant attitudinal barriers to buying groceries on-line. Indeed, these barriers were even more significant than barriers to other on-line activities.

Reasons for consumer resistance include the following:

1. Grocery shopping is a habitual act. While the average consumer shops for groceries 2.2 times per week, few consumers shop so often for cars, books, or airline tickets. Thus, grocery shopping is more habitual, and it will take more effort to change consumer buying patterns. Moreover, consumers often visit several stores in a week, presumably looking for specific items or hoping to take advantage of specific promotions.
2. Grocery shopping is a community act. Most grocery consumers shop with someone, be it a spouse, child, or friend. On-line grocers must overcome the "serious social obstacle" that the community function of buying groceries at local supermarkets—where folks can interact with friends, neighbors, and relatives—is sometimes more important than the inconvenience associated with filling up a shopping cart.
3. There is no significant time savings associated with on-line shopping. Excluding driving time, the average consumer spends 45 minutes in his visit to the supermarket while the Peapod buyer spends 37 minutes.
4. Delivery is cumbersome and expensive, but also slow. In the age of instant gratification, Internet delivery will have to offer significant value to make up for slow delivery relative to traditional shopping (Jones, 1999).

LOGISTICS PRINCIPLES COMPONENTS THAT MADE SENSE

The **principle of selective risk** suggests designing logistics systems so that the system performance objectives are directly related to the importance of the product or customer to the firm (LaLonde, 1993). Streamline's research led the company to believe that stocking 55% of the currently available SKU count could cover approximately 90% of retail demand. This premise was strengthened by research showing that 33% of grocery shoppers accounted for 56% of purchases, and that 30% of customers

TABLE 3
ON-LINE USER ATTITUDES

% of Respondents who never plan to do the following on-line		% Who believe the following activi- ties are better on-line than the traditional way
1%	Research	87%
11%	Buy airline tickets	57%
12%	Buy books	38%
34%	Buy cars	24%
44%	Buy groceries	12%
60%	View pornography	14%

Source: Jones, 1999

accounted for 73% of all branded packaged goods purchases (Mathews, 1997). Seventy-two percent of Streamline's sales came from the lower margin grocery category. The balance came from products and services, such as dry cleaning and specialty foods (e.g., prepared meals, buffet trays), on which margins are higher. For example, their dry-cleaning service charged Streamline 95 cents for shirts, which the company retailed for \$1.50. A suit that cost Streamline \$3.75 brought in \$6.50 (Mathews, 1997).

The **principle of information selectivity** has an underlying assumption that information is as much of a resource to the decision maker as capital, human resources, and facilities. Information should be treated with the same operational, tactical, and strategic importance as any other resources of the firm (LaLonde, 1993). PeaPod recognized the capture of consumer usage patterns held value beyond just driving their delivery process. Peapod received revenue from selling information about its customers' buying habits to food suppliers (Leibs, 1997).

The **principle of transaction simplification** suggests improving the efficiency and effectiveness of the transaction through simplification (LaLonde, 1993). By stocking 75% fewer stock keeping units, on-line grocers could achieve significant cost savings. The average brick-and-mortar supermarket stocks 40,333 items; Home-Grocer.com stocked 11,000 items and Peapod 20,000 items. Lower numbers of SKUs improved inventory control and reduced sales lost to out-of-stocks to typically 3.1%. Approximately 8.2% of SKUs in brick-and-mortar stores are out-of-stock at any one time, so reducing SKUs by 75% should have significantly improved tracking ability and reduced lost sales associated with out of stocks (Jones, 1999).

The **principle of variance reduction** recognized that in any logistics system there are a series of linkages between demand and supply points. Failure to accurately anticipate demands at the next stage in the system often leads to erosion of system productivity. This erosion, in the form of excessive inventory, overtime, increased stock outs, or a variety of other variables, can directly effect system productivity and performance. This principle suggests that a logistics manager can significantly influence the productivity of the system by reducing unplanned variance in the system (LaLonde, 1993). Approximately 85% of grocery purchases are repetitive (Richards, 1996). Most on-line grocers recognized this fact and designed past-use libraries for their customers. This not only reduced the time it took to place an order after the initial learning curve, it served as a prompt to remind the customer of items they had overlooked.

The **principle of inventory velocity** suggests that, in order to achieve asset productivity in the management of inventory assets, logistics managers must focus their efforts on both the level of inventory and the velocity of inventory (inventory turnover) (LaLonde, 1993). Simply put, the on-line grocers never could reach high enough volumes in a concentrated area to achieve the efficiencies necessary for profitability. The bulky

nature of the deliveries limited Peapod's trucks to about 22 daily—a fraction the number that a typical FedEx or UPS truck makes (Holst, 2001). In the entire Chicago market, Peapod conducted at most 1,200 transactions a day. By contrast, a single supermarket in that market conducts an average of 2,100 transactions a day (Holst, 2001).

The **principle of shared/shifted risk** has as its guiding objective the shifting of the logistics cost structure from a fixed cost base to a variable cost base. By shifting costs to a supplier upstream in the channel (e.g., Kanban) or downstream to a customer (e.g., placing order by computer terminal), the logistics manager can shift fixed investment cost and risk outside the firm (LaLonde, 1993). While the on-line grocers were able to shift the ordering process to the customer, in return they accepted the burden of picking and delivery, which turned out to be a very inequitable and costly trade.

LESSONS LEARNED

Why did the on-line grocery concept fail? The demise of the on-line grocer was largely the result of the inability to achieve high enough volumes to override the additional costs of the on-line process. Some of these costs were start-up related and others were inherent in the process. It is also possible that the enthusiasm of e-commerce may have allowed some critical oversights in strategic expansion plans.

Many differing models of grocery retailing have evolved over time from the convenience store to traditional grocery store to warehouse club. All have the common element of customer pick. Perhaps the on-line design was too radical. Whether using warehouse automation or personal shopper, the on-line grocers failed to keep this cost element low. Clearly the benefits achieved by passing off the picking process directly to the consumer are great. Peapod's own research indicated a delivery pricing barrier of \$10 per delivery. Attempts to incorporate a delivery fee covering additional costs failed.

Quality control was a major factor. The number of items in the typical order exposed the process to one picking error out of every four orders. The inconvenience of an incorrect order likely prevented some customers from repeating the process.

The initial start-up cost of using an on-line grocer required that customers recognize the learning curve effect and accept this up-front cost in order to achieve future savings. In addition, consumers failed to realize the true value of their time or of the effort of the provider. This is not uncommon. Focus groups interviewed by next-flight-out transportation provider NextJet indicated they felt immediate freight services

should cost "a little more" than Federal Express next day. In fact, the total cost of handling a next-flight out shipment typically exceeds \$160 per package. Purchasing decisions based on total cost must correctly recognize the costs.

CONCLUSION

This article considered the changing face of the grocery industry. It considered the different types of on-line fulfillment and the basics driving grocery logistics. It looked at what worked and what did not work from a consumer behavior and logistics perspective. Finally it offered important lessons to be learned from the demise of the on-line grocer.

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