

Grocery Industry: Origins, Culture, Practices

The efforts of NCR, and later IBM, to fulfill the grocery industry’s information technology needs mirror the industry’s history. It is a story of industry transformation best appreciated in the context of supermarket origins and culture.

This White Paper provides a brief background of the industry and sketches the role played by NCR and IBM in major industry milestones. The Paper also assesses NCR and IBM strategies, strengths, and weaknesses and how their positions in the industry today may affect their DeCA response and prospects.

Background

What today is loosely referred to as the ‘Grocery Industry’ in the USA is comprised of a complex mix of dissimilar businesses.

Retail Market Size and Composition

The industry may be somewhat arbitrarily thought of as three distinct segments: Wal*Mart; Supermarket Chains; and, Independents. Their combined sales total approximately \$600 Billion.

- **Wal*Mart** – is the dominant retail grocer in the USA with grocery sales of approximately \$85 billion, out of a total sales volume of \$240 billion. Its grocery sales are projected to increase to \$110 billion by 2010. By comparison, grocery sales at Kroger, the largest USA supermarket chain are approximately \$55 billion. Wal*Mart’s reputation as the industry’s leading practice and technology innovator is reflected in the roughly 50% P/E premium at which its stock trades compared to the average ratio of the top 10 public supermarket chains.
- **Supermarket Chains** – in the year 2000 approximately 100 chains, with 50 stores or more, reported grocery sales of \$324 billion out of total sales of \$410 billion. The segment has lost approximately 6% market share during the last decade. Revenue growth has averaged 2% a year since 1990: essentially flat in inflation adjusted dollars.
- **Independents** – the Commerce Department¹ reports approximately 10,000 companies operate small grocery chains (of less than 50 stores), single unit stores, and convenience stores. An additional 90,000 operate below the “radar screen” of most surveys. Growth has averaged 4% (twice supermarket chain growth rates) with the ethnic sub-segment experiencing double digit growth. The segment is underreported in most surveys. It is characterized by scrappy small business owners who make-up with hard work what they lack in technology, scale and business practices.

<i>Segment</i>	<i>Sales (\$ billions)</i>	<i>Firms (000)</i>
Conventional Grocery	430	110
Drug Stores	84	48
Home Centers	116	70
Eating & Drinking	230	430
General Merchandise	285	36
Apparel & Accessory	108	146
Furniture/Appliances	125	113
Automotive	521	103
Gasoline Service	142	100
Other	220	311
Total	2,261	1,467

Source: Commerce Department

Table 1

¹ The Commerce Department reports the three segments above in two categories: ‘Conventional Grocery’ and ‘Other.’ See Table 1. Table 2 shows the composition of firms included in Conventional Grocery.



Supermarket Origins and Evolution

Supermarket origins can be traced to the 1800's. Store owners cobbled together informal supply chains that included: frequent buying trips to wholesale markets; service from wholesalers using horse drawn wagons; deliveries by local farmers and producers. Many business practices evolved even earlier. A Dutch or English warehouse manager from the 1600's suddenly transplanted to a USA food warehouse in the early 1900's would be right at home.

Methods of keeping track of stock, placing items to reduce labor, preparing orders, and computing bills had changed relatively little. Prior to 1950, the majority of grocery stores obtained products from such warehouses.

The early A&P was initially a hodgepodge collection of small grocery stores that benefited from an established brand, collective buying power, and access to wider markets. IGA² was initially a cooperative of small independent grocers organized for the same purposes. NCR began manufacturing mechanical cash registers during these early years. It gained dominance and a reputation for reliability and service.

The era of supermarkets began in the 1950's with the post World War II explosion of the suburbs and automobile ownership. Supermarkets, as we know them today, rapidly expanded in the 1980's and early 1990's when the industry invested more than \$40 billion to increase the average supermarket size from 17,000 square feet to 35,000. Billions more were invested to fill the additional shelf space by increasing the number of items stocked from 10,000 to more than 25,000.³

As supermarkets evolved, chains either established their own modern distribution centers (often 500,000 square feet or more) or entered into supply agreements with large national or regional distributors that arose to service the need for efficient, massive logistics.

Warehouses and distributors left behind by supermarkets continue to serve independents and stores with insufficient volume to take deliveries from major distributors operating

"Conventional" Grocery Industry

<i>Supermarket & Grocery Store Chains</i>					
<i># of firms</i>	<i>stores in chain</i>	<i>total stores</i>	<i>-- sales (\$ millions) --</i>		<i>share (%)</i>
			<i>grocery</i>	<i>total</i>	
1,104	2 - 3	2,560	14,333	14,345	3.6
585	4 - 10	3,398	25,680	31,292	7.7
196	11 - 50	4,065	42,719	44,700	11.1
78	51 - 200	7,841	87,700	111,234	27.5
26	201+	16,939	159,117	202,494	50.1
1,989	-----	34,803	329,549	404,065	100

<i>Single Unit Supermarkets</i>					
<i># of firms</i>	<i>revenue (\$ millions)</i>	<i>total stores</i>	<i>store sales (\$ millions)</i>	<i>total sales (\$ millions)</i>	<i>share (%)</i>
3,369	1 - 3	3,369	1.5	5,053	21.0
1,716	3 - 5	1,716	4.0	6,864	28.6
1,010	5 - 10	1,010	7.5	7,575	31.5
335	10 +	335	13.5	4,522	18.8
6,430	-----	6,430	26.5	24,014	100

<i>Convenience Stores</i>					
<i># of firms</i>	<i>stores in chain</i>	<i>total stores</i>	<i>total sales (\$ millions)</i>		<i>share (%)</i>
263	2 - 3	661	919		1.2
625	4 - 10	4,115	5,489		7.4
560	11 - 50	12,239	15,147		20.4
113	51 - 200	10,553	13,262		17.9
56	201+	42,738	39,296		53.0
1,617	-----	70,306	74,113		100

Sources: Chain Store Guide; Market Scope, Progressive Grocer; Supermarket News

Table 2

² IGA was subsequently acquired by food wholesalers. IGA membership now consists of supermarket-like stores with sufficient volume to buy from major distributors.

³ The \$40 billion investment was not a success. Sales stagnated. Supermarket chains' share of the USA grocery market share shrank 6% between 1990 and 2000. Profits decreased more than 20%. Chains then turned to acquisitions and mergers for growth. Neighborhood grocers, on the other hand, continued to thrive. (Sources: *New Market News* and *Best Practice Deal Management*, Field Marketing, Inc. 1999)

fleets of tractor trailers. Some expanded their Cash & Carry operations which service thousands of small grocers who visit 2 or 3 times per week to purchase goods for their stores.

Major Information Technology Milestones

The following information technology developments played important roles in shaping the industry.

- **Mechanical Cash Register** Registers transformed point-of-sale (“POS”) by facilitating fixed prices⁴ (as opposed to negotiated prices), speeding checkout, and improving accuracy and accountability. NCR’s early success established it as a major force. Its cash register’ focus helped it dominate the field – and hindered its adapting to computer based systems. Traces of the old cash register mentality remain which partially explains why NCR was marginalized in POS.
- **Mainframe Computer** IBM entered the grocery industry by placing mainframes at supermarket chain headquarters and warehouses during the 1950’s. The story of Charlie Fitzmorris illustrates how industry advances often evolved. Charlie hired IBM to develop a management software package for his supermarket chain, Benner Tea Company. When Benner Tea was acquired by a German firm in 1970, Charlie retained the rights to the software and founded Worldwide Chain Store Systems to market the software. IBM supplied the iron, Worldwide supplied software and systems expertise. At one point more than 40% of the products sold in major USA supermarket chains were processed on Wordwide software.⁵ Experience gained during the collaboration helped IBM enter the supermarket point-of-sale market. IBM purchased Worldwide during the 1990’s.
- **Electronic Register** Integrated circuits brought about electronic registers which replaced mechanical registers. Functional improvements included security, improved tender control, and transaction capture. NCR began with an 80% market share in the hospitality industry as well as in the supermarket chain and independent segments of the grocery industry. Additional processing enhancements were added to support the newly invented scanners. In supermarkets, registers came to be called ‘*front end systems*’ which, despite the name, remain point-of-sale rather than store management oriented.
- **Scanning** Initially justified as a labor saving device (by eliminating stick-on price labels), product scanning facilitated: product explosion to 25,000 SKUs⁶, category management, promotion proliferation, improved checkout speed and control. The computer based nature of enhanced front-end systems attracted new POS suppliers. IBM captured half of NCR’s POS market share in supermarket chains. [Micros](#) captured most of NCR’s share in the hospitality industry.
- **Enterprise System** Wal*Mart put it all together. See Table 3. Retail operations and the supply chain (now called ‘*demand chain*’) are treated as a seamless integrated operation. The result is a seemingly insurmountable gap between Wal*Mart and supermarkets. Wal*Mart ties up approximately \$2 billion less cash on grocery inventory than a comparable sized supermarket would because it has 7 days of inventory and supermarkets average 17 days. Yet Wal*Mart loses fewer sales to stock-outs because it has a 95% service factor and supermarkets average 85%. Supermarkets continue to fall behind as Wal*Mart widens the gap with innovative initiatives. Linking manufacturers’ operations and their raw materials procurement with Wal*Mart’s

⁴ Haggling remains alive and well in certain sections of the independent grocery segment.

⁵ A Teton Managing Director, [Don Vehlhaber](#), was Worldwide’s COO during its expansion from 5% to 40% share.

⁶ “**SKU**” (Stock Keeping Unit) is a unique item. A 12oz bottle of Hunt’s Hickory BBQ sauce is one item or SKU. The 16oz bottle is a different SKU. Most SKUs have a bar code that uniquely identifies the item. Modern supermarkets carry 20,000-50,000 SKU’s.

enterprise system is an example.⁷ Setting industry standards for RF tagging and forcing the pace in converting food manufacturer packaging is another.

Management Strategies

Most discussions about industry strategies and practices focus on supermarket chains. It is the segment that purchases consulting from the Accentures and Kurt Salmons. Chains award multimillion dollar contracts for big iron and big software. Food manufacturers can easily reach chains. Chains have infrastructure to administer promotions conceived by brand managers.

Such focus ignores 25% of the market – the independent segment. It also ignores that, to quote a former President of Cott Industries (manufacturer of Wal*Mart private label beverages), *“70% of our sales come from chains, but only 20% of our profits. The rest comes from independents.”* Steady growth in the independent segment, combined with chain stagnation, is attracting overdue attention. The ethnic segment, in fact, is hot.

Independents are particularly relevant for the DeCA opportunity. A visit to DeCA’s Fort Belvoir facility might give the impression that DeCA operates as a supermarket chain. The impression would be misleading. DeCA logistics are more similar to practices in small independents with sales of less than \$4 million per store than to supermarket chain logistical practices. DeCA also operates approximately 50 commissaries which have only 1 or 2 lanes.



Ft. Belvoir Commissary

Wholesale Supply

Food manufacturers, such as Procter & Gamble, sell cases of products by tractor trailer truckload: a truckload of 16oz canned pineapple, a truckload of 8 oz decaf instant coffee. Split truckloads (multiple products on the same truck) and deliveries to multiple locations are somewhat discouraged.

Chains procure the bulk of their products from major distributors or operate their own warehouses to receive truckloads from where cases of products are trucked to stores as needed.⁸ This primary supply process is efficient. Large regional and national distributors operate on gross margins of 7 to 9 percent earning a net income of 1%.

Because of the efficiencies, supermarkets procure as much product as possible via their primary supply source: 70 to 85 percent being typical. The relationship between distributors and supermarkets is complex because of the need to coordinate returns, manufacturer allowances, scheduling, price changes, and forecasts. Contracts are often cost-plus. Payment terms of 10-15 days are rigorously enforced. The more successful working arrangements ‘look like’ partnerships with high transparency.

⁷ Inventory carrying costs will be further reduced as manufacturers put their goods in Wal*Mart on consignment. Eliminating a product’s trip through the warehouse has the potential to trim 5-7% off its cost. Sales will increase as manufacturer brand managers continue to hone their skills on information from Wal*Mart systems.

⁸ Variations of general distribution, such as cooperatives and cross docking, are beyond the scope of this White Paper.



Not all supermarkets qualify to buy from efficient top-tier distributors because they do not meet distributors' criteria for minimum order quantities, docking facilities, and computerized ordering. Smaller, full-line distributors offer lower minimums, telephone order desks, and more flexible delivery. Costs are slightly higher because these distributors may receive lower volume discounts from manufacturers and must operate on higher gross margins to compensate for their smaller scale and additional service.

Supermarket purchases that do not flow through primary distribution are supplied by numerous **DSD** (Direct Store Delivery) suppliers. DSD is a high cost operation – 2 to 4 times as expensive as general distribution. The extra cost includes placing orders, stocking and 'dressing' displays, and replacing

outdated product. DSD occurs for a number of reasons. Perishables, such as dairy, require special service. Specialty products with low demand do not meet full line distributors' volume requirements. Certain manufacturers, such as Pepsi, tightly control deliveries to stores.

Food service firms such as **McLane's** serve as the primary supplier to convenience store chains. Service includes order generation, stocking, and split case delivery (as opposed to full case delivery by general distributors). Food service gross margins range from 15 to 25 percent.

Access to product is a problem for small neighborhood grocers. They have insufficient volume to buy from full line distributors and have difficulty passing on the cost of food service to their customers. Many use Cash & Carry distribution centers as their primary suppliers. Gross margins of such centers range from 9 to 15 percent, but their cost of goods may be as much as 10% higher than costs paid by the largest distributors. Small merchants thus pay 5 to 15 percent more than supermarkets and have the inconvenience of traveling to a Cash & Carry for supplies. They also miss out on most of the promotion funds brands make available to supermarkets.⁹ A Teton Sands client, Cash & Carry America, is attempting to consolidate Cash & Carry operators.

Wal*Mart is pioneering a new distribution paradigm. Manufacturers, such as Procter & Gamble, are testing just-in-time delivery from their factories directly to Wal*Mart stores. The goal includes placing goods on consignment in Wal*Mart stores with manufacturers receiving payment as goods are scanned. The initiative has numerous potential advantages, including: more transparency; less shrink; quicker response to trends; elimination of warehousing expense; and, less inventory in the pipeline.

Store Management Philosophy

The diversity of operating practices within the industry is partially explained by honest differences in high level management philosophy. A conservative culture, which views the abstract and theoretical with suspicion, also contributes to the differences. The culture tends to slow industry transformation which widens the gap between early and late adaptors. So does the chronic shortage of capital caused by low profit margins.

⁹ In a good year, supermarket chains may earn \$6 billion on sales of \$400 billion – despite receiving more than \$60 billion of promotion funding from brands for circulars, local ads, and in-store displays. Independent grocers receive less than \$1 billion of these funds.

- **Consistency** There is consensus about consistency. It is generally agreed there are significant benefits to consistent store formats, branding, equipment, and procedures. In practice, though, supermarkets don't subscribe to the Southwest Air model. Square footage and layouts vary widely from store-to-store which complicates planogramming¹⁰ and confuses customers. Prices necessarily differ from region to region because of variations in product and shipping costs. Supermarkets vary prices by how much the market will bear at a particular location.¹¹

Chains operate under different brands or banners. At the time of Fleming's bankruptcy, its 300 stores (ranging in size from 3,000 – 60,000 ft²) operated under 7 banners. If the Southwest Air analogy were extended to POS equipment, some chains would be flying each of Boeing's models

- **Market Concentration** There is also consensus about market concentration. Fifty stores in one geographic market are better than one store per state. Supply agreements, communications, advertising all make more sense. Again, there is disparity between consensus and practice. Fleming's stores, for example, were widely scattered.

- **Inventory Control** For an industry in which 75% of its cost is cost-of-goods, there is surprisingly little consensus about inventory control. Raise the question of inventory control, and most supermarket executives speak about warehouse inventory which is usually relatively well controlled – although as much as 70% of their inventory sits on store shelves. The sad fact is that few supermarkets ever know what sits on their shelves without taking a physical. Ordering is done manually by eyeballing empty spaces on shelves and scanning shelf label bar codes to order items. To quote the CEO of a multibillion dollar chain headquartered in Washington, DC, "I wouldn't mind doing automatic ordering, but I don't want perpetual inventory... it's too complicated."

It's even worse in the independent segment – many use old fashioned order sheets or write-up a shopping list on the back of a napkin. Unlike supermarket chains, however, small independents have been quick to embrace realtime perpetual inventory when made available.

One reason advanced for the resistance to realtime perpetual inventory at chains is the question of inventory write-off. Many chains sit on worthless inventory. A survey of Hannaford Brothers stores shortly before it was acquired revealed its stores had an eight month supply or more for 35% of their items. Peek into the totes in the back rooms of CVS stores and it's apparent the chain is sitting on millions of dead merchandise. Potential store inventory Sarbanes-Oxley disasters are waiting to happen.

Chain Totals: Weekly P&L By Store									
store	revenue	cost-of-goods	GM %	labor		other direct	HQ allocation	pre-tax	
				\$	%			\$	%
1	200,000	150,540	24.7	25,250	12.6	16,640	2,004	5,566	2.8
2	219,000	161,143	26.4	26,334	12.0	18,872	2,149	10,502	4.8
:									
99	187,767	142,232	24.3	23,544	12.5	15,856	1,892	4,243	2.3
100	178,961	137,443	23.2	21,656	12.1	14,676	1,810	3,376	1.9
total	20,000,000	15,000,000	25.0	2,400,000	12.0	1,800,000	200,000	600,000	3.0

Store # 1: Weekly P&L By Department									
dept	revenue	cost-of-goods	GM %	other		store OH	HQ allocation	pre-tax	
				labor	direct			\$	%
1 meat	31,700	25,700	18.9	1,950	220	5,581	348	(2,100)	(6.6)
2 produce	20,200	13,100	35.1	1,850	340	3,062	191	1,657	8.2
:									
41 HBA	8,140	5,398	33.7	447	167	1,204	75	849	10.4
42 breakfast	6,540	5,121	21.7	150	120	1,080	67	2	0.0
total	200,000	150,540	24.7	7,884	1,899	32,107	2,004	5,566	2.8

Figure A

¹⁰ Planograms are shelf layout plans which specify product placement. Planograms are usually maintained at headquarters and rigidly enforced at stores.

¹¹ To get their hands around price maintenance (letting 300 stores in a chain have different prices for each of 20,000 items would mean managing 6 million prices), chains group stores into 'zones.' Prices are identical for stores within a zone.

- **Delegation** Strongly held opinions exist about delegation strategies. They include the fully cost allocated profit center reporting techniques honed by Harold Geneen at ITT and Jack Walsh at GE – and widely used by professional service firms.

The report in Figure A shows the concept. To some chains, Figure A is an anathema. “*Our managers would ask for raises if they knew how much they made...the data might fall into our competitors’ hands*” are frequently heard objections. Most chains peg bogies to sales volume rather than profit.¹² Some focus on cost control (for example, limiting the number of cashiers or shelf stockers). Others establish key factors to measure employee performance.

Management attitudes about employee empowerment and assigning ownership à la *Territorial Imperative* speak directly to numerous centralized vs. distributed issues. They affect practices (and associated technology) such as inventory control and management accounting. They have architectural implications about the placement of functions at the headquarters or store level.

At the risk of oversimplifying, Wal*Mart tends toward delegation: supermarkets toward centralization. Wal*Mart extends delegation beyond its employees to brand managers who often have more actual power over a Wal*Mart store’s success than store employees. Supermarkets are more likely to look inward and bring information and processes into corporate. Which will succeed? Chains are playing catch-up, but the jury is out and there may be more than one path to success.

POS Suppliers

Four suppliers hold approximately 90% of the POS market in supermarkets: IBM, NCR, ICL and Wincor-Nixdorf. IBM is first with NCR a close second: combined they may have 80% share with ICL and Wincor-Nixdorf sharing the bulk of the remainder. None of them have appreciable share among small independents: their offerings are not scaleable and are perceived as too expensive.¹³ Micros has a commanding lead in the hospitality industry, but has no plans to enter the grocery market.

Both IBM and NCR depend heavily on software developers and VARs (Value Added Resellers now euphemistically called Strategic Business Partners). Software developers are the more valued partners. Their software, combined with IBM or NCR commodities, creates a useable product that attracts VARs. VARs round out the offering by adding service value. NCR and IBM sales personnel work the larger accounts (called national accounts) and farm out less lucrative pickings to VARs. Channel conflict is a constant problem. Competition rather than cooperation often defines relationships. NCR and IBM are both expected to meet the minimum requirements of the DeCA RFP.

- **IBM** brought its strength in computers to the market as registers became multifunction computers. That, and the company’s existing relationships with executive management at chains, gave IBM powerful advantages when supermarkets upgraded their POS systems. Over the course of two decades, IBM seized approximately half of NCR’s market share. Generally speaking, IBM POS systems are perceived as being more expensive and more computer-like (more open, more programmable) than NCR systems. IBM VARs are perceived as being more loyal and more professional than NCR VARs. IBM corporate heavily touts open systems as a strategy to

¹² Which sets-up counter productive behavior such as trashing slow moving product to make room for faster moving product.

¹³ Used IBM and NCR equipment does show-up in the small independent market. The independent market is replete with numerous small vendors, many of whom use COTS hardware and third party software. The highly scaleable CRISP system, for example, offers many of the realtime features found in Wal*Mart’s enterprise systems.

combat Microsoft. IBM's DeCA bid, however, can be expected to pitch the virtues of a tightly bundled IBM product. IBM can also be expected to stress its considerable expertise and experience in supporting complex information systems.

- **NCR** came to the market as a purveyor of cash register products. Many NCR managers earned their stripes selling small merchants door-to-door and lacked the polished team selling skills of IBM. Certain NCR business practices were notorious. Merchants were forced to upgrade on 5-7 year cycles by dramatically raising maintenance fees on old models. Data formats, hardware interfaces,¹⁴ and communication protocols were highly proprietary.

Many NCR VARs were diehard cash register heads with at best a superficial knowledge of computers. IBM and Micros cherry picked the NCR VAR pool. Micros successfully used the strategy to take most of the hospitality POS market from NCR.

Hayman Cash Register is an example. The largest cash register dealer in the metropolitan Washington/Baltimore area, and long time NCR dealer, converted to Micros which subsequently acquired the firm. NCR suffered a severe setback in the mid-1990's when its advanced POS software package, developed at the cost of more than \$100 million, failed after being heavily hyped. NCR is making a comeback with Teradata Warehouse®. The product appears superior to DB2 and is gaining NCR new respect in supermarket executive offices.

Both companies's systems have an Achilles' heel: rigidity. Users and business practices must too often adapt to system features. Their inexperience with realtime systems is also a disadvantage.

DeCA Operations

In many respects, DeCA's task is the worst of all worlds. Rather than being concentrated in major geographic markets, its 'stores' are scattered worldwide – many in out-of-the-way places with minimum access to suppliers. The mix of stores ranges from single lane stores to operations with 30 checkout lanes.



Given the conditions, standard supermarket commercial logistical models will not work at all commissaries. DeCA's model is best described as modified DSD. Brokers visit commissaries after closing to reorder products and dress shelves in preparation for next morning's business. Brokers establish relationships with specialty distributors to meet DeCA schedules – and often handle ordering and payment paperwork for manufacturers (the official suppliers) who do not wish to modify their commercial practices.

DeCA's model tends to reassign to outsiders the responsibility for numerous functions normally performed in-house by supermarkets (supermarket staff, for example, typically order and stock the shelves for 70 – 85 percent of their products). Doing so increases DeCA's cost-of-goods. The price advantage to commissary patrons is thus somewhat less than the 1% and 5% mark-ups would initially suggest.

¹⁴ The popular Magellan 3D scanner pioneered by SpectraPhysics for example had to be manufactured with two interfaces: RS232 and a proprietary NCR interface.

Although it is not possible to draw exact comparisons between DeCA's operational model and commercial models, it is possible to develop approximate P&L comparisons of the models. The analysis shown in the Appendix suggests there may be a \$300 million opportunity gap. Two issues in particular merit consideration:

- **Inventory control** Shrink, ordering mistakes (which cause overages and outages), and ordering costs could be reduced by using perpetual inventory controls. DeCA receiving is especially error prone and easily gamed.
- **Delegation** The mix of formats, dispersed geographical areas, and delegation of responsibility to brokers would appear to favor more rather than less functionality distributed to DeCA's POS. Placing certain data preprocessing functions in POS would also facilitate data headquarters/commissary communications and simplify development of DeCA's headquarters software. Additional functionality in POS would tend to favor IBM over NCR's solution. It would also give an advantage to an open systems approach based on COTS hardware.

DeCA's long relationship with NCR, its contracting history for POS and headquarter systems, and its concept of operation are the subjects of a separate White Paper.

Conclusions

POS functions required for large DeCA commissaries are different than functions required for small commissaries.¹⁵ Like many organizations, DeCA presents a moving target. Practices evolve as conditions change and lessons are learned. It is unrealistic to expect DeCA to cast a functional specification in stone – or even to expect that a DeCA functional specification would necessarily totally reflect reality. In such an environment, a flexible system with feature bench-strength and the ability to accommodate alternative practices for such functions as receiving and tender reconciliation has advantage over more rigid systems.

Consider receiving. Every case might be scanned – or items might be manually checked against a purchase order and exceptions entered into the system. Both practices are valid. Their relative merits depend upon the size and make-up of an incoming shipment. The difference on large shipments at a Navy commissary (not DeCA operated) on Andros Island, for example, was 40-60 labor hours – per shipment.

Flexibility reduces implementation costs and increases customer satisfaction. Existing practices are maintained as systems are initially installed – which minimizes training and familiarization costs. Practices are then changed on schedules dictated by the customer instead of by the system. The customer's executives, rather the system, are seen as driving change which deflects user resistance. The system should tolerate unapproved practices (such as ringing a sale to a department) without shutting down a checkout lane. Though tolerant, it should help management impose change by identifying and measuring the consequences of such unapproved practices.

	<i>Wal*Mart</i>	<i>Kroger</i>	<i>Albertson's</i>	<i>Safeway</i>
Sales	\$81B*	\$53B	\$36B	\$32B
Operating Cost	16.6%	22.1%	24.1%	25.9%
Operating Profit	5.2%	4.9%	5.1%	5.2%
Gross Margin	22.2%	27.0%	29.2%	31.1%
Net Income	2.3%	2.2%	1.4%	(2.5%)

*USA food only
Source: SEC 10K filings; Kroger & Albertsons thru 3 quarters;
Wal*Mart & Safeway full year

Table 3

¹⁵ Functions such as maintaining security codes and changing prices are performed in a backroom administrative office in a large commissary. In a small commissary, the commissary manager may perform these functions at the register while simultaneously eating lunch and ringing up sales. The register is the main office in small stores.

The ability of store systems to operate semi-autonomously of headquarters is a benefit in widely dispersed networks such as DeCA. The previously mentioned Navy commissary occasionally loses communications with headquarters for as much as a day. Communications is erratic on the best of days. This factor would argue in favor of placing additional store management features in store systems.

An open system approach, including COTS hardware and local replacement sourcing, would reduce system cost and increase network robustness.

Wal*Mart is the industry's low cost operator, which is the key to its success.

High volume grocery store management is a classic realtime application with similarities to message switching and Command & Control.

Many of the industry's technical difficulties in controlling stores can be traced to applying non-realtime tools to realtime jobs. Some of Wal*Mart's early success can be attributed to using realtime Tandem computers. Systems such as NCR and IBM (which use non-realtime networked multi-processor architectures) have performance and feature disadvantages compared to architectures that exploit realtime multiprocessing techniques. Architectural concepts and approaches are the subject of a separate White Paper.

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