

A Survey of the Past, Present, and Expected Future  
Data Capture Methods Used in the Retail Industry  
For Taking Periodic Inventories

by

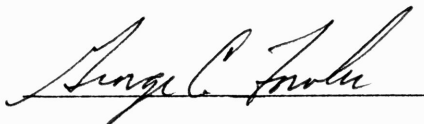
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A handwritten signature in cursive script, reading "George C. Fowler", written over a horizontal line.

Dr. George C. Fowler

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## ABSTRACT

Automated data capture technology has existed since the early 1960's. The banking and supermarket industries have enjoyed success with magnetic ink character recognition and barcode. Department and specialty store chains were surveyed to determine their past, present, and expected future methods of capturing data for periodic inventories. It was also designed to develop profiles of department and specialty stores with regard to three inventory-related characteristics: data recorded and processed, merchandise ticket types, and point-of-sale (POS) systems. This paper reports on the implementation and results of the survey.

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## INTRODUCTION

This paper discusses data capture techniques used by the retail industry for counting physical inventories. The focus of the study concerns the method in which the inventory information is converted into a computer readable form - automatically or manually. Automated data capture has already enjoyed a very high success rate in the the supermarket and banking industries<sup>1</sup>. It has made its appearance in the retail industry in the form of point of sale terminals<sup>2</sup>, but the extent of its use for counting items in inventory is not as well documented. This project is intended to aid retailers and calculating service companies. Retailers can benefit from an increased knowledge of industry norms. Service companies may benefit as well by examining retailer needs in light of certain inventory characteristics. The discussion is divided into three major segments. A description of the methods used for data capture, as well as the information usually recorded and processed by the retailers can be found in the data description section. The next section discusses the implementation of the survey: sampling methodology, questionnaire design, observed response rate, and response handling procedures. Finally, the results of the survey are presented in the data analysis section. It contains a compilation of three basic characteristics of an inventory system, and descriptions of the past and current data capture methods used for counting inventories in the retail industry. Those that the retailers expect to use in the future are also presented.

## DATA DESCRIPTION

### Data Capture Methods Available to Retailers

Two types of data capture methods are available to the retail industry: manual and automated. The manual methods involve some degree of human interpretation of the data contained on merchandise tags, while automated methods directly read and convert data into a computer-useable format.

Three of the more common manual methods include listing on sheets, pulling non-scannable tags, and tabulating with a portable tenkey calculator. Sheet listing is usually performed by teams of two people, a "caller" and a "writer". The caller counts the quantity of a specific type of merchandise, and tells the writer certain information including the quantity and price of the items. Pulling non-scannable tags is a similar method, although used mostly for furniture and other large, costly items. As the name implies, it simply involves collecting tags from the merchandise. Both methods are quite flexible, as they can be used in almost any environment and there is essentially no limit to the number of employees that can participate. The data is then usually key entered into a computer-readable format for processing. Therefore, the size of an individual store is less of a problem when trying to take inventory in a short period of time.

Using portable hand-held tenkey calculators (with or without memory capabilities) is also considered to be a manual inventory taking method. The technique requires that a data entry clerk key enter the inventory data while counting the merchandise. Those

devices that do not have memory can only total for one department or classification; that total must then be recorded for later tabulation.

If the device does contain memory, it must be uploaded periodically to some larger storage device for subsequent computer processing. With or without memory, the data is still interpreted by humans at least once before conversion into a computer-readable format.

The automated methods are all quite similar in technique. When taking inventory using pre-punched tickets, the tickets are pulled and later read in batches by a stationary reader. Bar code, OCR, magnetic strip, and MICR tickets require some reading device, usually a portable one. A wand is one such device which permits data recognition; it is simply passed over the tag and the inventory data is copied into memory exactly as it appears on the ticket.

Errors in capturing the inventory data fall into three categories: (1) incorrect information printed on the ticket, (2) omission or multiple counting of items, and (3) misinterpretation of the data. The first two possible errors will affect any of the described data capture methods, while misinterpretation of the data only affects the manual methods. From an accuracy standpoint only, it is clearly desirable to utilize an automated method of data capture. However, the manual methods are much more flexible.

### **Data Items Captured from Inventory**

The information that the inventory data provides can be grouped by financial, merchandising, and auditing information<sup>3</sup>. Table 1 shows the normal usage, length, and type of common data recorded and

processed from an inventory. While age may not appear to be a financial item, it is used for financial decisions. The average age of inventory for any particular store reflects the ability of that store to turnover its merchandise. This information is then used to determine the amount and interest rate of loans for the store to purchase additional merchandise in the future. Also, vendor and style numbers may be recorded separately or combined.

Table 1. Common Inventory Data Items

<u>Item</u>	<u>Usage</u>	<u>Length</u>	<u>Type</u>
Store	Fin	2-3 characters	Numeric
Department	Fin	2-3	Numeric
Classification	Fin	1-3	Alpha/Numeric
Quantity	Fin	1-3	Numeric
Price	Fin	3-5	Numeric
Age	Fin	1-3	Alpha/Numeric
SKU	Merch	8	Numeric
Vendor	Merch	3-4	Numeric
Style	Merch	4-5	Numeric
Size	Merch	2-3	Alpha/Numeric
Color	Merch	2	Numeric
Description	Audit	Variable	Alpha
Fixture	Audit	1-2	Alpha/Numeric

## **SURVEY IMPLEMENTATION**

### **Sampling Methodology**

The target population consisted of the top 100 department and top 100 specialty store chains in the United States, ranked by 1983 sales<sup>4</sup>. Appendix 1 contains the list of recipients. General merchandisers were excluded due to the wide variety of merchandise carried, much of which is not found among either specialty or department stores. Department stores carry merchandise similar to that found in specialty stores, with the exception of Radio Shack, the nation's largest specialty store chain. Survey packets were mailed in October 1984 to the vice-president controller or vice-president finance level of each firm. In the absence of finding a similar title, the packets were sent to the president of the company. It was hoped that this would increase the response rate, since the president or vice-president is likely to request that a subordinate complete the questionnaire.

The survey packet consisted of four items: a cover letter, an information request card, a pre-addressed return envelope, and the questionnaire. The cover letter explained the purpose of the project and assured the respondent of total anonymity (Appendix 2). Included was a card for requesting the results of the survey, returnable separately or with the pre-addressed envelope that was also enclosed for the convenience of the respondent (Appendix 3). Finally, the three page questionnaire appears in Appendix 4. The title indicates the type of store to which the survey was sent, the only demographic

information collected from the respondents.

The response rate was a higher than expected 31 percent for both department store chains and specialty store chains, giving a 31 percent overall response rate. Also, 85 percent of the responding companies requested the results of this project, which indicates a rather high interest level among the respondents. Since descriptive methods are used for analyzing the results, only those questions with an invalid response were eliminated. The criteria for valid responses are detailed below. Total number of valid responses are indicated for each question's results.

### **Response Handling**

The results from several questions included in the original survey are not analyzed by this paper for several reasons. Question 1 asked the respondent to give the percentage of total units and percentage of total value for which their company records merchandising information. The question is ambiguous, and the desired information is contained in the response to Question 2. Question 8 requested that the respondent rank the performance level of their current data capture methods with regard to several aspects of taking inventory. The results from such a question are not useful since the aspects listed were not sufficiently explained so as to assure a consistent interpretation among responding retailers. Finally, Question 10 asks that the respondent supply a percentage breakdown of costs allocated to the inventory taking effort. The effect of service

companies that provide external manpower was not anticipated; the results do not clearly indicate the percentage a responding company spends on the different categories.

Determining a response's validity was handled on a question by question basis. Many of the questions requested a response in percentage form. If the respondent used a check mark, it was accepted as 100 percent, unless two or more mutually exclusive answers were similarly checked. In the latter case, the response was considered to be invalid, and was thrown out. Questions 2 and 3 asked information concerning data recorded as well as data processed. Vendor only, style only, and vendor/style were mutually exclusive responses. If the total was greater than 100 percent, the response was further examined to determine if the vendor/style percentage matched the vendor only or style only percentage. If so, this was considered to be a valid response, and the three percentages were adjusted to reflect assumed values. If not, then the response was considered invalid. Finally, Question 9 asked the respondent to check the methods of capturing inventory data that the firm has tried over the past five years but is not currently using. If any of the methods checked corresponded to a method the company is currently using, then it was simply removed from Question 9's response. These were seen as logical adjustments that would not seriously affect the outcome of the descriptive analyses.



## **DATA ANALYSIS**

It was hoped that the results of the survey could be analyzed using chi-square goodness-of-fit to test any differences between department and specialty stores, and to search for characteristics related to the type of inventory taking method used. However, since most of the responding companies use quite similar methods, all cross tabulations tested produced tables with over 20 percent of the cells containing less than five observations, which causes results of the test to be suspect. Therefore, descriptive statistics are the only data analysis performed on the survey's responses. The data analysis is divided into two main parts: (1) observed inventory related characteristics of the retail industry, and (2) the past, present, and expected future inventory data capture methods.

### **DATA ANALYSIS - INVENTORY RELATED CHARACTERISTICS**

Several observable characteristics of the retailers are related to the methods they use to capture inventory data. Three of the more important characteristics include the number of data items recorded and processed from inventory, the current merchandise ticket style, and the current point-of-sale (POS) methods used. Any automated device contemplated for the future must meet the recording

requirements. A company's current merchandise ticket style reflects its present capability for automated data capture. This is also related to the POS method used. An automated POS system requires most of the merchandise tags within a store to be machine readable. POS is always a more important consideration than taking inventory to a company, because it is a system that is used every day, whereas an inventory counting system is used only twice each year.

### **Data Items Recorded and Processed**

Some of the data collected from the inventory is further processed, while other data is used only for auditing purposes. Any future methods for capturing inventory data must recognize the requirements that the number of items recorded and number of items processed will place on the system. The amount of data to be collected must be considered in order to utilize portable devices with memories. Table 2 presents the frequency of each item that a company records when taking an inventory. Of the 61 companies responding to this question, almost all record the expected store, quantity, and price data. Since it is possible for the retailer to record an sku or vendor/style number and later determine the price of the item, this is the probable cause for price not being recorded by more than 55 companies. Refer back to Table 1 (page 5) for the length, usage, and type of each data item.

**Table 2.** Frequency of each item of data currently recorded. 61 responses.

<u>Item Recorded</u>	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Quantity	29	97%	31	100%	60	98%
Store	29	97	31	100	60	98
Price	24	80	31	100	55	90
Department	20	67	31	100	51	84
Classification	18	60	27	87	45	74
Age	9	30	26	84	35	57
Description	10	33	22	71	32	52
SKU	18	60	12	39	30	49
Fixture	7	23	21	68	28	46
Vendor	7	23	18	58	25	41
Style	8	27	14	45	22	36
Size	6	20	4	13	10	16
Color	4	13	5	16	9	15
Other	1	3	1	3	2	3

As seen in Table 2, retailers do not record all 15 data items for every unit in stock. Question 2 asked the respondent to estimate the percentage of units in inventory for which the firm records each item.

Two averages can be computed using this information, the average number of different data items recorded per company and the company's average number of data items recorded per unit, shown in Table 3. Although the standard deviations are rather high to make definite assumptions, these tables are useful in describing how much an automated data capture method must recognize and record for a typical department store's or specialty store's inventory.

**Table 3.** Averages and standard deviations for number of different items recorded per company, number of items recorded per unit.

<u>Statistic</u>	<u>Specialty</u>		<u>Department</u>		<u>Overall</u>	
	<u>Avg</u>	<u>Dev</u>	<u>Avg</u>	<u>Dev</u>	<u>Avg</u>	<u>Dev</u>
No. of different items per company	6.2	2.7	8.4	1.9	7.3	2.6
No. of items per unit	5.5	2.3	7.4	1.3	6.5	2.1

The items that are processed, or used in the reporting process, are also of interest to the retailer. The device or system used for recording may have to consider this aspect as well as the number of items recorded. Table 4 contains the frequencies of each item processed. It is supplemented by Table 5 which gives the average and the standard deviation for the number of different items processed per company, as well as for the average number of items processed per unit in inventory. It is possible for an item of information to be processed but not recorded, as could be the case with the earlier price example. This situation could account for the items in Table 11 which have a higher frequency than its corresponding item in Table 9. The same 61 companies responded to this question.

**Table 4.** Frequency of each item of data currently processed. 61 responses.

<u>Item Processed</u>	Specialty		Department		Overall	
	<u>Freq</u>	<u>Pct</u>	<u>Freq</u>	<u>Pct</u>	<u>Freq</u>	<u>Pct</u>
Quantity	29	97%	31	100%	60	98%
Store	29	97	31	100	60	98
Price	27	90	31	100	58	95
Department	22	73	31	100	53	87
Classification	20	67	26	84	46	75
Age	12	40	25	81	37	61
SKU	16	53	12	39	28	46
Vendor	9	30	13	42	22	36
Style	9	30	12	39	21	34
Color	5	17	5	16	10	16
Description	4	13	4	13	8	13
Size	4	13	4	13	8	13
Fixture	3	10	0	0	3	5
Other	0	0	0	0	0	0

**Table 5.** Averages and standard deviations for number of different items processed per company, number of items processed per unit. 61 responses.

<u>Statistic</u>	Specialty		Department		Overall	
	<u>Avg</u>	<u>Dev</u>	<u>Avg</u>	<u>Dev</u>	<u>Avg</u>	<u>Dev</u>
No. of different items per company	6.1	2.6	6.9	1.5	6.5	2.1
No. of items per unit	5.6	2.3	6.2	1.0	5.8	1.7

## Merchandise Ticket Types Currently Used

The number of ticket types used by a company may affect the method of data capture that company uses for taking inventory. For any automated method, the ticket types are quite important. The manual methods are much more flexible, and can handle any ticket type with human readable data. Table 6 contains the number of ticket types per company. As can be seen from the table, only one company among those responding uses more than 2 types of tickets. The department stores have significantly more respondents with 2 or more ticket types, which might indicate that specialty stores have a greater capability for automated data capture, whether or not an automated POS or inventory method is used.

**Table 6.** Number of ticket types per company. 61 responses.

Number of Ticket Types	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
1	26	87%	16	52%	42	69%
2	4	13	14	45	18	30
3	0	0	1	3	1	1
	-----		-----		-----	
	30	100%	31	100%	61	100%

The frequency of use for each ticket type is presented in Table 7. Percentages are based on the 61 responding companies. Non-scannable tags dominate the industry. Note that barcode and MICR are not used often as inventory ticket marking methods, even with their proven success rates. After punched tickets, OCR is used by 16 percent of the respondents, most of which are department stores. Remember that OCR experienced a high "try and abandon" rate among specialty stores for the past five years. These data give insight into how much the industry is currently prepared to use an automated method for taking inventory. On the whole, the industry is not capable of a speedy conversion from a manual to an automated method.

**Table 7.** Frequency of each ticket type's use. 61 responses.

Ticket Type	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Non-scannable	22	73%	27	87%	49	80
Punched ticket	6	20	9	29	15	25
OCR	3	10	7	23	10	16
Magnetic strip	1	3	4	13	5	8
Barcode	2	7	0	0	2	3
MICR	0	0	0	0	0	0

## POS Systems Currently Used

The ticket types do not represent the entire picture, however. The POS method that a company uses can be the determining factor as to whether a company tickets its merchandise with scannable tags or with non-scannable tags. Automated POS systems have been accepted by a significant amount of the retail industry. Question 4 in the survey simply asked respondents to check the POS methods they currently use. No attempt was made to determine each system's percentage of use within a company. That would have been too difficult an amount for the retailers to estimate. Table 8 presents the frequencies of the number of POS methods used by the respondents. Over 70 percent indicated that they use only one method for recording POS data. About 22 percent indicate that their companies use two methods, while only a small fraction uses three methods.

**Table 8.** Frequency of number of POS types per company. 62 responses.

Number of POS Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
1	24	77%	22	71%	46	74%
2	6	19	8	26	14	23
3	1	3	1	3	2	3

Table 9 outlines the frequencies of each POS system the respondents currently use. It is clear that the manual input terminal is the most popular POS method among the respondents. Handwritten sales checks are a distant second. The dominance of the manual methods is probably due to their flexibility. It is not surprising



that the number of automated POS systems is small in this sample. The merchandise ticket type analysis showed that the industry does not currently have a high capability for automated data capture. Since the POS terminals have only existed since the mid 1970's for retailers, the high cost of converting from manual to automated may be one reason that only a few companies have completed the transformation.

**Table 9.** Frequency of each POS method's use. 61 responses.

POS Method	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Keyed terminal	20	65%	30	97%	50	81%
Handwritten checks	9	29	6	19	15	24
Punched tickets	5	16	2	6	7	11
Magnetic strip	1	3	3	10	4	6
OCR	1	3	0	0	1	2
Other	3	10	0	0	3	5

## DATA ANALYSIS - METHODS OF DATA CAPTURE

### Past Methods of Data Capture

Question 9 requested the respondent to check the methods the firm has used in the past five years but is not currently using to capture its inventory data. If the company listed any methods it is currently using, that method was simply dropped from the list. Table 10 shows the frequency of the number of methods the companies have tried. A little over half of the companies surveyed did not try any other method of taking inventory in the past five years. The remaining 47 percent is the focus of the rest of this analysis.

**Table 10.** Number of methods tried in the past five years (not currently used). 62 responses.

Number of Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
0	14	45%	19	61%	33	53%
1	13	42	9	29	22	35
2	3	10	3	10	6	10
3	1	3	0	0	1	2
	-----		-----		-----	
	31	100%	31	100%	62	100%

Table 11 contains the frequencies of each method tried to give some picture of which ones are not used any longer. Percentages are based on the total of 62 companies responding to Question 9.

Twenty-nine companies have discontinued the use of thirty-seven total methods of taking inventory. One third of the department stores have tried using punched ticket readers and abandoned the method within the

last five years. OCR readers, hand-held tenkey calculators, and sheet listing are the other methods with significant frequencies, mostly originating from the specialty stores.

**Table 11.** Frequency of methods tried but not currently used. 62 responses.

Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
No change	14	45%	19	61%	33	53%
Punched tickets	3	10	10	32	13	21
OCR	6	19	1	3	7	11
Hand-held tenkey	5	16	1	3	6	10
Sheet listing	5	16	0	0	5	8
Pull non-scannable	2	6	2	6	4	6
Barcode	1	3	0	0	1	2
Other	0	0	1	3	1	2

### Present Methods of Data Capture

In the survey, Question 7 asked the respondent to estimate the percentage of total units in inventory for which a certain inventory taking method is used. The frequency of number of methods used by each company is presented in Table 12. Seventy percent of the companies prefer to limit their number of inventory taking methods to one type, especially in the specialty store category. None of the responding companies use more than two methods. This indicates that the retailers try to use consistent methods for taking inventory of most of their items.

**Table 12.** Number of methods currently used. 62 responses.

Number of Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
1	25	81%	19	61%	44	71%
2	6	19	12	39	18	29
	-----		-----		-----	
	31	100%	31	100%	62	100%

Since the retailers use either one or two methods, the frequencies of each method is presented in two ways. The first part of the discussion centers around the methods used for a majority of units in inventory, while the second part presents the methods used for any percentage of units in inventory. Table 13 includes only those methods used for a majority of items in inventory. Sixty-three methods are observed because one specialty store estimates its inventory is taken 50 percent by one technique and 50 percent by another. Note that only two companies currently use an automated method for capturing the majority of items in their inventory (the methods presented as "Other" are all manual). The dominant method is listing on sheets for both department and specialty stores. The hand-held tenkey calculator is the next most used method, used by twenty-eight percent of the specialty stores but none of the department stores.

**Table 13.** Frequency of each method currently used for a majority of units in inventory. 62 responses.

Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Sheet listing	19	59%	30	97%	49	78%
Hand-held tenkey	9	28	0	0	9	14
Magnetic strip	1	3	0	0	1	2
OCR	0	0	1	3	1	2
Other	3	9	0	0	3	5
	-----		-----		-----	
	32	100%	31	100%	63	100%

Thirty percent of the companies responding indicated that they use two methods to capture inventory data. Table 14 shows the frequencies of the data capture methods used for any portion of units in inventory, which adds these "second methods" to the analysis. A total of 80 methods are used, but the percentages are based on the sixty-two responding companies. Sheet listing and hand-held tenkey calculators still hold relatively the same percentages. The most important fact from the table is that none of the second methods are automated, except the punched ticket readers. The only new methods introduced are punched tickets, non-scannable tickets, and other manual methods.

**Table 14.** Frequency of each method currently used for any portion of units in inventory. 62 responses.

Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Sheet listing	22	71%	31	100%	53	85%
Hand-held tenkey	10	32	0	0	10	16
Punched tickets	0	0	3	10	3	5
Pull non-scannable	1	3	2	6	3	5
Magnetic strip	1	3	0	0	1	2
OCR	0	0	1	3	1	2
Other	3	10	6	19	9	15

### Expected Future Methods of Data Capture

Question 10 attempted to gather information about which methods the retailers expect to see in the future. It is an open-ended question, and as such allowed any number of answers. The percentages are based on the 27 companies that responded, and the total of 37 answers are summarized in Table 15. The modified sheet is a form of sheet listing; this involves computer scannable sheets. Even though data entry is automated, data capture is still manual, and essentially the same as listing on sheets. The method mentioned most often is barcode, followed by hand-held tenkey calculators and OCR. It is interesting to note that barcode is not currently being used by any company, while OCR has been tried and abandoned by as many respondents as expect to see it as a future method. One department store, however, is planning to institute the barcode method for one hundred percent of units in inventory by the end of this year. Also, the hand-held tenkey device is what the department stores seem to expect,

while fully one-third of the specialty stores but none of the department stores currently use it for a majority of the units in inventory.

**Table 15.** Frequency of each method mentioned for future use. 27 responses.

Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Barcode	10	67%	3	25%	13	48%
Hand-held tenkey	2	13	6	50	8	30
OCR	5	33	2	17	8	30
Modified sheet list	1	7	3	25	4	15
Magnetic strip	2	13	1	8	3	11
MICR	0	0	1	8	1	4
Punched tickets	1	7	0	0	1	4

Table 16 presents combined responses from Table 16. It reveals that most of the retailers expect to see some sort of portable device used for capturing inventory data, which does include the hand-held tenkey calculator. Without the tenkey, almost 75% of the companies responding to Question 10 expect some automated scanning device. Several companies mentioned that cost is the reason they are not using currently available automated reading devices.

**Table 16.** Combined frequencies of responses from Table 16. 27 responses.

Methods	Specialty		Department		Overall	
	Freq	Pct	Freq	Pct	Freq	Pct
Portable	14	93%	10	83%	24	89%
Scanning Device	14	93	6	50	20	74
Manual Method	3	20	9	75	12	33

## SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Even though automated data capture methods have enjoyed success in other industries, the results of this survey indicates that they are not currently popular among the department store and specialty store segments of the retail industry. The majority of the respondents use manual data capture methods for both point-of-sale (POS) and periodic inventories. In the past five years, many department stores and a few specialty stores have abandoned the use of punched ticket data capture. A significant number of specialty stores have tried and are not currently using sheet listing and OCR for taking inventory. Currently, sheet listing is used by every department store and by two thirds of the specialty stores. The next most popular data capture method is the hand-held tenkey device, another manual technique, currently used only by the specialty stores. In the future, the department stores expect to use the tenkey calculator, while the specialty stores expect that portable scanning devices for barcode or OCR will be the method used for capturing inventory data.

The analysis of this survey was strictly descriptive, because the survey was intended to serve an exploratory purpose. Further research might be directed toward finding a reason for the retailers' slow acceptance of automated data capture. The industry might be wary of new techniques due to their seemingly unproductive relationship with punched tickets.



## NOTES

1. Miller, Frederick W., "Majic Wand Comes of Age with New Uses," Infosystems 28, No. 7, (1981), pp. 42-48.

2. Miller, J. Joseph, "The Status and Impact of the ORC-A Standard," Retail Control 50, No. 5, pp. 47-57.

3. Most of the information for this section was provided by Ms. Constance Anton, Vice-President Marketing and Production, Contract Dataflo, Inc.

4. Schulz, David P. "Top 100 Stores: The Winners!" Stores 66, No. 7, (1984), pp. 25-34.

Schulz, David P. "The Top 100 Specialty Chains: How They Rank." Stores 66, No. 8, (1984), pp. 16-21.

APPENDIX 1

LIST OF RECIPIENTS

### TOP 100 DEPARTMENT STORE CHAINS

- |                                   |                              |
|-----------------------------------|------------------------------|
| 1. Macy's New York                | 51. Gimbel's Midwest         |
| 2. Bamberger's                    | 52. Howland-Steinbach        |
| 3. Macy's California              | 53. Winestock's              |
| 4. Broadway Southern California   | 54. Boscov's                 |
| 5. Dillard's                      | 55. Goudchaux/Maison Blanche |
| 6. Bloomingdale's                 | 56. Wieboldt                 |
| 7. Abraham & Strauss              | 57. Younkens                 |
| 8. Hudson's                       | 58. Sibley                   |
| 9. May Company                    | 59. G. Fox                   |
| 10. Marshall Field                | 60. Castner-Knott            |
| 11. Lord & Taylor                 | 61. Joseph Horne             |
| 12. Burdine's                     | 62. Gimbel's                 |
| 13. Foley's                       | 63. Jones Store              |
| 14. Bullock's Southern California | 64. Diamond's                |
| 15. Emporium-Capwell              | 65. M. O'Neil                |
| 16. Dayton's                      | 66. May-D & F                |
| 17. Rich's                        | 67. ZCMI                     |
| 18. J. W. Robinson's              | 68. Joske's Houston          |
| 19. Hect's                        | 69. Joslin's                 |
| 20. Jordan Marsh                  | 70. Goldsmith's              |
| 21. Gimbel's East                 | 71. McRae's                  |
| 22. The Bon                       | 72. Joske's Dallas           |
| 23. Lazarus                       | 73. Denver Dry Goods         |
| 24. Famous-Barr                   | 74. Broadway Southwest       |
| 25. Woodward & Lothrop            | 75. Gayfer/Montgomery Fair   |
| 26. Sanger Harris                 | 76. Boston Store             |
| 27. John Wanamaker                | 77. Miller & Rhoads          |
| 28. Shillito/Rike's               | 78. Bacon's/Roots            |
| 29. Stern's                       | 79. J. B. White              |
| 30. Carson Pirie Scot             | 80. Ivey's Carolinas         |
| 31. Strawbridge & Clothier        | 81. Hahne & Co.              |
| 32. Davison's                     | 82. H. C. Prangue            |
| 33. Maas Brothers                 | 83. Joske's San Antonio      |
| 34. Kaufman's                     | 84. Donaldson's              |
| 35. L. S. Ayres                   | 85. Goldwater's              |
| 36. Filene's                      | 86. Gottschalk's             |
| 37. Gayfers                       | 87. Strouss                  |
| 38. Helmut                        | 88. Adam, Meldrum, Anderson  |
| 39. D. H. Holmes                  | 89. Ivey's                   |
| 40. Jordan Marsh                  | 90. Lion                     |
| 41. McAlpin                       | 91. Robinson's               |
| 42. Thalheimer's                  | 92. J. L. Brandeis           |
| 43. Higbee                        | 93. Pizitz                   |
| 44. Macy's Midwest                | 94. Miller's                 |
| 45. Frederick & Nelson            | 95. Read's                   |
| 46. Elder-Beerman                 | 96. John A. Brown            |
| 47. B. Altman                     | 97. Hutzler's                |
| 48. May Company                   | 98. Stewart Kentucky         |
| 49. P. A. Bergner                 | 99. Block's                  |
| 50. Meier & Frank                 | 100. May-Cohens              |

### TOP 100 SPECIALTY STORE CHAINS

1. Radio Shack
2. Mervyn's
3. Toys "R" Us
4. Marshall's
5. Saks Fifth Avenue
6. Nordstrom
7. Lerner's
8. Levitz
9. Petrie Stores
10. Kinney Shoe
11. Brown Shoe
12. Edison Bros. Shoe
13. Hart, Schaffner, & Marx
14. Neiman Marcus
15. T. J. Maxx
16. Gap Stores
17. Alexander's
18. B. Dalton
19. Thom McAn
20. Fayva
21. Volume Shoe
22. Zale Jewelers
23. The Limited
24. Casual Corner
25. C. R. Anthony
26. Waldenbooks
27. Child's World/Children's Palace
28. Lane Bryant
29. Brook's Fashion
30. Herman's
31. Fine Jeweler's Guild
32. Loehmanns
33. Spencer Gifts
34. Oshman's
35. Kay Bee
36. I Magnin
37. Circuit City/Lafayette
38. Pic-a-Dilly/It's-a-Dilly
39. Foot Locker
40. Edison Apparel
41. House of Fabrics
42. Charming Shoppes
43. Miller-Wohl
44. Weiner's Stores
45. Lechmere
46. Pic "n" save
47. Gallenkamp
48. Richman Brothers
49. Burlington Coat
50. Gordon Contemporary
51. Jacobson's
52. Brooks Brothers
53. Fabri-Centers
54. Hit or Miss
55. Musicland
56. County Seat
57. Cloth World
58. Liony
59. Butler Show
60. Pacific Stereo
61. Kay Jewelrys
62. Chess King
63. J. Byron
64. Pier One
65. Syms
66. Foxmoor
67. Haverty Furniture
68. Hancock/Fabric Warehouse
69. Gordon Traditional
70. Filene's Basement
71. Manhattan Industries
72. W. S. Badcock
73. Tower Records
74. Breuner's
75. Fashion Bar
76. Parisian
77. Minnesota Fabrics
78. American Home Video
79. Crazy Eddie
80. Shoe Town
81. Rhodes
82. Odd Lot
83. Household Merchandising
84. Reliable Sources
85. Tiffany
86. Bonwit Teller
87. Lamont's
88. R. B. Industries
89. Pic n pay
90. Nebraska Furniture
91. J. Riggings
92. National Shoes
93. Wickes Furniture
94. Heilig-Meyers
95. Merry-go-round
96. Winkleman's
97. Berman'sd
98. The Children's Place
99. Paul Harris Shoes
100. Garfinckel's

APPENDIX 2

COVER LETTER

TEXAS A&M UNIVERSITY  
COLLEGE OF BUSINESS ADMINISTRATION  
COLLEGE STATION, TEXAS 77843-4217

Department of  
BUSINESS ANALYSIS & RESEARCH  
409/ 845-1616

October 30, 1984

Dear Sir:

I am currently a senior at Texas A&M University in College Station, Texas, and am involved in a University Honors Program designed to give undergraduates the opportunity to perform research in their major field for the period of two semesters. Working with me as an advisor is Dr. George Fowler of the Business Analysis and Research Department. This survey represents the first phase of my study concerning data capture methods used by the retail industry in recording physical inventories. The top 100 department store chains and the top 100 speciality store chains are recipients of this survey.

Specifically, my project will determine which methods of data capture are used in the retail industry, which methods are available (manual or computerized), and which methods appear to work best given the information required by the industry. -

The survey you are asked to fill out is designed to answer these questions:

- What information do you record when taking an inventory?
- Which methods of capturing data do you employ?
- How well do these methods work for you?
- What trends in data capture do you see for the near future?

Any additional comments or observations you wish to supply are certainly welcome. Aggregated information from this survey will only be used for this project, publication by Texas A&M University, and possible publication by a trade journal. The information you supply will not be linked to your company in any way. If you are interested in receiving the results of this project, please fill out and return the enclosed card, and I will send you a copy of the report. To maintain total anonymity, you may return the card separately.

I wish you luck in your coming Christmas rush, and am looking forward to your reply. Thank you for your cooperation.

Sincerely,

*Herb Billings, III*

Herb Billings, III

APPENDIX 3

REQUEST FOR INFORMATION CARD

Dr. George Fowler  
Department of Business Analysis and Research  
College of Business Administration  
Texas A&M University  
College Station, Texas 77843-4217

Attention: Herb Billings, III

If you wish to receive the results of this project,  
please fill out this card. You may return it separately  
or with the survey.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip code \_\_\_\_\_



APPENDIX 4

SPECIALTY STORE SURVEY

SPECIALTY STORE SURVEY

What types of inventory do you take? Please estimate for both the percentage of total inventory value and the percentage of total units in inventory:

<u>% value</u>	<u>% qty</u>	<u>type</u>	<u>description</u>
_____	_____	financial only	non-sku or no vendor/style
_____	_____	financial and merchandising information	sku or vendor/style
_____	_____	_____	_____
_____	_____	_____	_____

What information do you record? Please estimate the percentage of total units in inventory for which you record the following information:

_____	store	_____	sku	_____	description
_____	department	_____	vendor only	_____	fixture
_____	class	_____	style only	_____	_____
_____	quantity	_____	vendor/style	_____	_____
_____	price	_____	color	_____	_____
_____	age	_____	size	_____	_____

What information do you process? Please estimate the percentage of total units in inventory for which you process the following information:

_____	store	_____	sku	_____	description
_____	department	_____	vendor only	_____	fixture
_____	class	_____	style only	_____	_____
_____	quantity	_____	vendor/style	_____	_____
_____	price	_____	color	_____	_____
_____	age	_____	size	_____	_____

How do you capture information at point of sale?

_____	OCR reader (non-bar code)	_____	punched ticket reader
_____	bar code reader (non-OCR)	_____	manual terminal/register input
_____	MICR reader	_____	hand written sales checks
_____	magnetic strip reader	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SPECIALTY STORE SURVEY

Please estimate the percentage of total units in inventory represented by each of the following general types of merchandise:

_____ Men's apparel	_____ Giftware	_____ Sporting goods
_____ Women's apparel	_____ Textiles	_____ Toys
_____ Children's apparel	_____ Major appliances	_____ Books & records
_____ Shoes	_____ Furniture	_____
_____ Jewelry	_____ Consumer electronics	_____

How is your merchandise ticketed? Please estimate the percentage of total units in each type of merchandise which has pre-punched tickets, magnetic strip tickets, etc. (Example - What percentage of men's apparel has pre-punched tickets?)

	Ticket Type					
	Pre-punched	Magnetic strip	MICR	OCR	Bar Code	Non-Scannable
Men's apparel	_____	_____	_____	_____	_____	_____
Women's apparel	_____	_____	_____	_____	_____	_____
Children's apparel	_____	_____	_____	_____	_____	_____
Shoes	_____	_____	_____	_____	_____	_____
Jewelry	_____	_____	_____	_____	_____	_____
Giftware	_____	_____	_____	_____	_____	_____
Textiles	_____	_____	_____	_____	_____	_____
Sporting goods	_____	_____	_____	_____	_____	_____
Toys	_____	_____	_____	_____	_____	_____
Major appliances	_____	_____	_____	_____	_____	_____
Furniture	_____	_____	_____	_____	_____	_____
Consumer electronics	_____	_____	_____	_____	_____	_____
Books & records	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

How do you capture information for taking your physical inventory? Please estimate the percentage of total units in inventory taken by the following methods:

_____ list on sheets	_____ OCR reader (non-bar code)
_____ pull pre-punched tags	_____ bar code reader (non-OCR)
_____ pull non-scannable tags	_____ MICR reader
_____ hand-held 10-key terminal	_____ magnetic strip reader
_____	_____
_____	_____

SPECIALTY STORE SURVEY

Please indicate level of satisfaction for the following aspects of the inventory taking methods your company uses:

1 = Satisfactory performance  
5 = Unsatisfactory performance

	Scanning Device	List on Sheets	Pull Pre-punched Tags	Pull Non-scannable Tags	Hand-held 10-key	Other
ease of management	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
audit trail	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
accuracy	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
total taking cost	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
service company	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	S            U	S            U	S            U	S            U	S            U	S            U

Check the methods you have tried in the last five years but are not currently using to record your physical inventory:

- |  |  |
|--|--|
| <input type="checkbox"/> list on sheets            | <input type="checkbox"/> OCR reader (non-bar code) |
| <input type="checkbox"/> pull pre-punched tags     | <input type="checkbox"/> bar code reader (non-OCR) |
| <input type="checkbox"/> pull non-scannable tags   | <input type="checkbox"/> MICR reader               |
| <input type="checkbox"/> hand-held 10-key terminal | <input type="checkbox"/> magnetic strip reader     |

\_\_\_\_\_

\_\_\_\_\_

Please estimate the percentage of total costs for each process involved in the taking of inventory. If you allocate other costs to taking inventory, please list.

- |  |       |
|--|-------|
| <input type="checkbox"/> payroll             | _____ |
| <input type="checkbox"/> internal processing | _____ |
| <input type="checkbox"/> external processing | _____ |
| <input type="checkbox"/> supplies            | _____ |

Please describe the trends you see in capturing data for your physical inventory:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_