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## Point of Sale Technology and Its Impact on North Dakota Retailers

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POINT OF SALE TECHNOLOGY AND ITS IMPACT ON NORTH DAKOTA  
RETAILERS

By

Al J. Moszer

Bachelor of Business Administration,  
University of North Dakota, 2002

A Thesis

Submitted to

The Graduate Faculty of

the University of North Dakota

in Partial Fulfillment of the Requirements

for the Degree of

Master of Science

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May

2004

This thesis, submitted by Al J. Moszer in partial fulfillment of the requirements for the degree of Master of Science from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

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This thesis meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

Joseph D. Benoit  
Dean of the Graduate School

April 30, 2004  
Date

PERMISSION

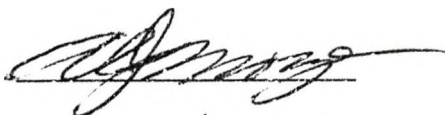
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## ABSTRACT

The purposes of this study were two fold. The first purpose was to see which retailers were using Point of Sale Technology (POS). The second purpose was to analyze whether or not POS has saved the company money by reducing the number of physical inventories. To answer these questions a survey of North Dakota businesses was employed. The population for this study was broken down into four groups of retailers. The first group was a representation of retailers who sell building materials. The second group comprised retailers classified as variety stores, i.e., as Ben Franklin stores. The third group was classified into automobile parts & suppliers-retail-new. The final group was classified to encompass convenience stores.

The sample for the survey numbered 275 retailers in North Dakota from the four selected categories. After the initial mailing and follow-up letter, a total of 107 questionnaires were returned (38.90%).

Overall the results showed that there is a positive impact on businesses that use a POS system. It was reported that 39 out of the 56 respondents that use a POS system stated their POS systems saved their companies money. The majority of the respondents, 36 out of 54, use some kind of POS system and reported that they were very familiar with their POS systems. The results showed that 43 respondents rated their POS systems as either easy or very easy to use. This is a very good indication that the POS systems of today are easy to use.

Companies reported that they spent an average of \$1,916.88 a year to do inventories. They also spent an average of 7.43 hours a week on inventory control. The results of this survey show that there is a benefit to using a POS system. POS can reduce inventory frequency and lower overhead costs.

## CHAPTER 1

### INTRODUCTION

Business owners have been looking for solutions for inventory management for years. In years past, one had to add all of the sales by hand and do frequent physical inventories in order to keep track of the products and transactions, and stay current with the reordering of items. The solution to the problem of how to keep track of inventory has been greatly enhanced by technology. There is now both software and hardware available that tracks items from the time they arrive at the store to the time they are sold. This is known as Point of Sale Technology (POS).

POS technology is a combination of hardware and software used for a wide variety of purposes. One purpose is to assist in maintaining a company's inventory. Another function of POS is tracking customer data, i.e., "what are customers' shopping habits?" One more use for a POS system is for coupon printing and promotions. This function allows retailers to print coupons on their sales receipts, thereby encouraging customers to buy more.

An article in *PC World Communications* (2003) reported, "PC America is helping retailers to increase revenues. A new feature in CRE2000 gives businesses the ability to print coupons on the bottom of sales receipts" (p. 2).

POS can have a very positive impact on retailers in several areas including the overall reduction in time and cost of maintaining inventory control, tracking sales history, and keeping track of customer data. There is a POS system suited for virtually any type of business. There are a number of companies that will customize a POS system for an individual company. These systems can cost anywhere from \$1,000 to over \$100,000 dollars.

A good POS system can be a vital tool for today's businesses. The capabilities of POS are multifold and can help solve the problem of inventory management. POS can also increase a business' profits by printing sale coupons which help entice more customers into the store. It also can be used to track customers' spending habits and track items from the manufacturer to the retailer which can prevent loss during shipping.

Overall POS is a very beneficial tool for retailers of all sizes. The benefits POS provide outweigh the cost of

the system, which usually pays for itself within the first two years (Clark, 2002).

#### Problem Statement

The purpose of this study was to determine the effect of POS on businesses in North Dakota.

#### Goals

The goal of this study was to analyze whether or not the introduction of POS has saved money by helping companies do a better job of controlling inventory because inventory control is a huge part of operating expenses. The study utilized the following questions to see if using a POS system can save a company money.

- What companies are using a POS system?
- How did the users rate their POS systems in performance and user friendliness?
- Does the respondent's familiarity with their POS system affect whether they felt the POS saved the company money?
- Do companies feel that their POS systems save them money?

- Is there difference in time spent on inventories for companies who use a POS vs. companies that don't?
- What was the dollar amount spent on inventories for companies who use POS vs. those that did not?

The answers to these questions could help benefit North Dakota retailers and the North Dakota Small Business Bureau, by showing how and if companies can save money.

#### Justification of Study

The frequency of doing physical inventories is costly in both man-hours and dollars. Conducting inventories takes personnel away from their regular tasks resulting in extra cost. POS can reduce the time and number of inventories a company does. POS accurately tracks how many products and what kinds of items are sold and returned. Because profits are the bottom line affecting most companies, managers always need to look for ways to lower costs and, thereby, increase profits.

Wal-Mart is one of the most successful companies in the world. Wal-Mart has the one of the best POS systems in use today. Mauldin (2002) reported that, "Wal-Mart generates \$413 for every sq. ft. of space whereas Kmart sells only \$222 per sq. ft.

Wal-Mart does this by maintaining 62 distribution centers each with an average 1.2 million sq. ft of storage" (p. 2). Since Wal-Mart has a POS system that is linked to all of its distribution centers and most of its suppliers, it saves time and money on restocking its stores. Its POS also saves them and money through better inventory management.

Wal-Mart's POS serves as a good example of how a POS can help a company increase its profits. This study explored how POS has increased the ability for companies to lower costs, save time and increase profits. A survey was determined to be the best method to obtain the information required to answer the questions in this study. The use of a survey made it possible to determine what companies were using a POS system.

#### Limitations of the Study

The factors that limited this study were:

- The study was limited to the retailers in the state of North Dakota as listed by the InfoUSA company.
- The study was limited to four selected groups of retailers (building materials, variety stores, automobile parts & suppliers-retail-new, and convenience stores).
- The study was limited by the respondent's knowledge of POS systems.

## Definition of Terms

*Bar Code:* The bar code is the label that has the lines and numbers on it; this is the label that the retailer scans. This code is used to store product information. The bar code is also known as the UPC.

*POS:* Point of Sale. This is the complete system of software and hardware that includes the scanner, computer, cash register, card reader, and monitor. These components are used for inventory tracking and control.

*Scanner:* This is the item that reads the item's UPC bar codes. The scanner comes in many different styles. These include hand-held devices or the table style found at the checkouts. The scanner uses a laser to detect and read the UPC and display the information on the screen. The scanner can also send the product information to the main computer for product tracking and reordering.

*UPC:* Universal Product Code is the bar code found on products. This code contains vital information about the product such as the name, size, manufacturer, and price.



VMI: Vendor Managed Inventories. The distribution channel is monitored and managed by the manufacturer /vendor instead of the retailer. (Del Cid, 2002, p. 2)

#### Summary

Can POS save retailers money and if so how? These are the two problems that this study looked at.

A good POS system can be a vital tool for today's businesses. The capabilities of POS are multifold and can help solve the problem of inventory management. POS can also increase a business' profits by printing sale coupons which help entice more customers into the store. Retailers can reduce overhead costs cost by streamlining the inventory process through use of a POS system. Wal-Mart is a good example of a company who benefits from the use of its POS system.

Wal-Mart's POS links all of its stores to their distribution centers as well as the main headquarters in Arkansas. This gives them the ability to analyze information quicker and know what items each store needs.

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

Point of Sale (POS) technology isn't new; it has been around since the early 1970s. This technology has developed into a broad system capable of many different tasks other than inventory control. The first and foremost function of POS is inventory management. Inventory management includes the recording of items received, the sale of items and the generation of reports related to these activities.

Today's POS systems do so much more than just keep track of inventory. Some of the many functions of modern POS systems are tracking customers' shopping habits, printing coupons and tracking sales history. POS systems of today can be linked to a retailer's suppliers which speeds up the reordering process. POS systems are designed today to help out virtually all retailers from gas stations, to restaurants and grocery stores.

It is vital that a company keeps its POS system modern and up to date. One doesn't have to look any further than Kmart. Kmart used to be the nation's number two retailer

behind only Wal-Mart. For years Kmart let its technology lapse, and this led to problems. As Desjardins (2002) stated, "While many of its key competitors were upgrading their in-store systems with kiosks and self-scan checkouts, Kmart reached the end of the millennium with stores whose technology was simply outdated and inefficient" (p. 38).

There are virtually hundreds of different POS systems today. Cosby (1993) found that "A retailer can now order a component system (just like buying a stereo) that is made up of several components that are easily plugged together to run software under standard operating systems like DOS and UNIX" (p. 128).

#### POS Systems and Costs

There are a few basic components to every POS system. The basic components needed for a POS are a computer, computer software, a scanner, and a UPC label maker. These components comprise the simplest system. Other components can be added such as card readers and display monitors that will show the customer exactly what was purchased and what the cost of the item was.

Other items include components such as weight scales, pole displays, receipt printers, and cash drawers to name a few.

The research for this study showed that there are over 60 different domestic companies that offer POS systems or POS components. In addition, many foreign companies who also make and sell POS systems. Some of these vendors include PAR, NRC, Panasonic, Radiant, Compris, and Aloha (Dues, 2000).

Current POS systems today are neither as expensive nor complicated to use as the early models. Today's POS systems have many features that offer many different uses. These features along with the wide variety of vendors, offer all retailers the ability to use a POS system to help their business.

POS systems range in price from as low as \$1,000 to over \$100,000, depending on the store and what the POS is used for as well as the number of components purchased. For instance, a retailer can get a complete system that includes both hardware and software called QuickBooks for as little as \$1,499.95. This system can track up to 50,000 individual store items in real time for complete accuracy (*EDP Weekly's IT Monitor*, 2002).

McClain (1998) reported that a company named Streamlined Information Systems (SIS), makes a video shop software that with equipment costs as little as \$1,000 to

for single stores, to less than \$2,000 for multi-user systems. *PC America* (2003) found that, "a typical Point-of-Sale System (Computerized Cash Register) consists of a computer, software, and added peripherals. It costs approximately \$2.10 per day to computerize (over a three year period of time). A typical computer system can save you \$83.33 per day on average" (p. 2).

#### POS System Usage

There are a wide variety of uses for POS systems. They are used in every type of retail business today. The use of these systems has expanded exponentially in recent years. We can now find POS systems being used by retailers and non retailers alike.

POS can now be found in places such as lunchrooms. Dorman (1998) found that "Point of sale systems are useful in the development of effective school lunch programs" (p. 80). Dorman looked at how schools are using POS to keep track of all sorts of different data both on eating habits as well as controlling food inventory. These features allow schools to plan better menus and help give the school a better idea of how many meals to prepare each day.

Video stores are now using POS systems to track more than just how many movies they have. McClain (1998)

reported that POS systems can now be used to "keep track of how many coins, bills, and bank-card receipts go in and out of the drawer throughout the day" (p. 40). This helps a business prevent loss by employee theft. Video POS systems are great for tracking a customer's rental history. This enables the store to notify the customer when a new movie becomes available that fits into the customers viewing habits.

Wal-Mart is a retail giant that has set itself apart from other retailers by developing what many experts believe to be a great POS system. Beatty (1997) reported, "A Wal-Mart owned and operated satellite communications network passes the scanned information to the Bentonville data base. The system subtracts your purchase from total inventory in the supply chain and automatically directs both store replenishment and supplier purchase transactions" (p. 1). This system keeps all of the interested parties informed of a particular store's sales and replenishment needs.

Businesses are looking for ways to cut cost and improve customer service. POS systems can be a big part of accomplishing these goals. They reduce operational costs and can help increase profits by providing the retailer

with vital consumer spending habits, which can or do result in having promotional sales to entice more business.

There is new process that is known as Vendor Managed Inventories (VMI). This system uses a POS system that shares retailer sales information with vendors. This process offers multiple benefits to both the vendor and retailer. Del Cid (2002) reported that, "Its primary benefit, however is improved customer service due to fewer stockouts and more optimal product mixes" (p. 3). VMI uses POS to help the vendor manage what products the retailer needs through the sharing of sales information.

Companies need to take time and research POS to make sure they get the best product for their business. This is a vital step to implementing a POS system for a company. A retailer must insure that they are getting the system that best fits their needs. Burtzloff (2002) stated, "it's always best to check with the experts prior to making your final decision. The result could be significantly increased sales and improved customer service" (p. 2).

#### POS Profit Benefits

There are several benefits that a company can experience from using a POS system. One benefit is the

potential savings in tracking and updating pricing on different products.

An example is KB Toys that Froehlich (2004) reported, "would experience a \$500,000 savings in automated promotional pricing and a \$950,000 savings in their merchandise return and warranty validation".

Another benefit is in the area of time savings in the area of inventory control. POS enables a company to greatly reduce the amount of time it spends doing physical inventories. Inventory control is accomplished on a POS system by scanning an item's bar code, and then entering the number of items on hand into the scanner, which then automatically sends the data to the main computer. The computer compares the information entered against the information on hand for that item. This takes a fraction of the time that doing all of these steps manually would.

Balistreri (2001) reported that according to the National Restaurant Association restaurants can expect to see the following savings per year. The figures are based on national averages, and reflect POS savings for a restaurant doing \$1,000,000 in sales per year. Using preset and standard pricing, coupon/discount control, and guest check-addition change calculation



- 1% of sales or \$10,000 per year on speed of service and increased table turns.
- 5% of sales or \$5,000 per year by increased sales, suggestive selling, and sales contest.
- 1% of sales or \$10,000 per year through processing fees, credit card tip reduction.
- Savings of \$1,800 per year [not defined by author].

These new and different uses can potentially lead to more profits through repeat business. Customers are much more likely to return to a business that provides quick reliable service and quality products.

#### Customer Service Improvement

In today's fast paced world of stiff competition, customers want better and quicker customer service. POS can help accomplish these goals in several ways. First, it can keep better track of all aspects of sales, which can free up management to do more tasks.

One way that retailers are addressing the need for better and quicker customer service is through the use of self-checkout stations. These stations are part of a POS system that allows the user to pay for items without going through a regular checkout.

This means less standing in line and quicker shopping trips for the customer. As Meyer (2002) reported, "Self-checkout has moved out of the realm of experimental and into the mass retailing mainstream" (p. 49).

Kermer (1999) discussed how the V. Sattui Winery improved their customer service by updating their POS system. Kermer described how the old system was causing the lines at the checkouts to spill over into the areas of operation such as the gift shop and wine tasting area. The winery was able to correct this problem by updating their POS and cash register systems.

Kermer (2002) gave another example of how a good POS can improve customer service in her article about the Schlotzsky's deli chain. This chain is using the Internet to increase its business. She explained how having the Internet orders go straight into the POS system allows the company to boost sales.

Internet sales allow the company to take orders in advance, which helps reduce waiting time for the customer. The POS will automatically enter the order into the que at the appropriate time for the order to be completed on time. A customer can email an order at 9:00 a.m. and request the order be ready at 11:45 a.m., and the system will

automatically store the order and enter it at the appropriate time.

#### Summary

POS technology can offer North Dakota retailers some very inexpensive ways to not only stay competitive, but to modernize their businesses.

Modern POS systems offer North Dakota retailers a wide variety of choices in both hardware and software. These choices can give those retailers options such as inventory control, tracking of customer shopping habits, coupon printing and in item sales trend tracking. With these options comes an opportunity for a company to lower overhead costs through better inventory control. Another benefit is increased profit through more repeat sales resulting from better customer service.

## CHAPTER III

### METHODOLOGY

#### Introduction

This study of POS systems and how it impacts North Dakota retailers was conducted to determine if POS offered benefits to its users. In order to collect the necessary information, a survey of North Dakota retailers was conducted.

#### Survey Instrument

A survey (Appendix A) of business managers in the North Dakota retail industry was used to gather the data necessary to answer the research questions. There were several steps involved in the development of this survey.

The first step was to identify pertinent categories that relate to sales and Point of Sale (POS) technologies. These categories included demographics, store information, and inventory. These categories were designed to gather adequate information on North Dakota businesses and answer the problem of the study. The second step was to develop a questionnaire using questions regarding demographics, store information and inventory.

The third step was to determine a sample of the population to survey. A list of businesses (i.e., a sampling frame) was compiled using data from a web source called InfoUSA, based in Omaha, Nebraska. This source was used because the North Dakota State Tax Commissioner's office was not able to release any information on individual North Dakota businesses due to privacy laws. The Tax Commissioner's office referred me to the North Dakota Job Services. A link at the Job Services web site was used to access InfoUSA.

Next a cover letter was written (See Appendix B). This letter was used to introduce the researcher and state the purpose of the study. The cover letter also provided a breakdown of the questionnaire by the three different parts and assured the anonymity of the respondents.

A follow-up letter was written (See Appendix C). This letter had a dual purpose. First, it reminded the retailer about the survey. It also expressed the importance of their participation in the study.

Packets that contained the cover letter, the questionnaire and a postage-paid return envelope were assembled, individually numbered for tracking, and mailed to the participants.

## Sample

A list of North Dakota retailers was obtained from InfoUSA. Of the categories available, four groups were selected. These groups were: building materials, variety stores, automobile parts, and convenience stores. These groups were chosen because it was believed that they would encompass a large percentage of POS users. There were 1,023 stores in four groups. An initial mailing of 275 surveys was sent out. The companies were chosen randomly by picking every fifth company on each list. This method was used to get the sample size needed for the survey. It was determined that this percentage would provide a sufficient amount of data for the purpose of this study.

The questionnaire was sent to a total of 275 retailers selected from the four groups (Table 1). There were 244 businesses that fell into the Building Materials category. This group included lumberyards, hardware stores, and construction companies.

Table 1

List of businesses by groups

Groups In Study	Businesses in Group	Number of questionnaires sent	Percentage of total questionnaires sent
Building Materials	244	70	25%
Variety Stores	23	8	3%
Automobile Parts	253	69	25%
Convenience Stores	503	128	47%
Totals	1023	275	100%

The second group was variety stores. This was the smallest group with only 23 businesses. This group consisted of retailers such as Ben Franklin and Dollar Store.

The third group was automobile parts & suppliers-retail-new; there were 253 businesses in this group.

Some of the types of retailers in this group were Batteries Plus, American Tire and CarQuest Auto Parts.

The last group in the study was convenience stores, which consisted of gas stations and grocery stores. This was the largest group containing 503 businesses.

### Survey Data

The survey data were broken down into three sections: 1) demographics, 2) store information, and 3) inventory. These sections were designed to gather data regarding how POS affects the retailers that use it.

Demographics questions in this section covered the following topics: respondent's position in the company, current position (Appendix C), education level, and whether the respondent had an advanced degree and the field of that degree.

Questions in the store information section asked for information such as how many employees that store had and the number of its cash registers or checkout stations. This section also asked the respondents if they use a POS system. Questions in this section were used to gather data on the kind of POS systems being used, and how well the POS system works for the retailer.



The inventory section gathered information such as what brand of hardware and software a company uses for its POS. This section also explored how familiar the respondent was with their POS. The respondents were also asked to rate their POS for ease of use and the overall satisfaction level with the POS.

The final part consisted of inventory issues relating to inventory control such as how often inventories are conducted both with POS and prior to getting POS. It explored reasons why the companies don't use POS systems. This section also dealt with the amount of time spent on inventory control, and the amount of time spent on PC system maintenance.

### Data Analysis

SPSS statistical software was used to evaluate data gathered by this study. Statistical analysis including chi-square and t-test techniques were used to compare group data in different areas.

The compiled data was used to create informational tables to show the number of companies in each group. The data was also grouped to show the number of respondents from each group surveyed. The following discussion and

tables show how the respondents were broken down into different groups.

Compiled data were also used to analyze the number of companies using POS. This information is used to give a clearer picture of which companies are using a POS system. This information would help determine if one group benefited more than another.

## CHAPTER IV

### FINDINGS

#### Introduction

An initial response of 48 (18%) responses was received. Approximately 21 days later, 100 follow-up letters with surveys and postage paid return envelopes were mailed to retailers who had not responded to the initial mailing. A lack of financial resources allowed for only 100 follow-up packets to be mailed.

Another 59 responses were received after the follow-up packets were sent. Of the 275 surveys sent out there was 107 (38.90%) returned responses. Two of the returns were from businesses that are no longer in business; these two respondents were not used in any data analysis due to the fact that they didn't answer any of the questions on the questionnaire. This data was broken down by the different groups (Table 2).

This study examined many different areas of the companies surveyed. The survey was broken down into three sections: 1) demographics, 2) store information, and 3) inventory. The demographic information included position in

the company, educational level and the number of years the respondents have been in their current position with the company.

Table 2

Number of respondents by industry

Groups By Industry	Number of Questionnaires Sent	Number of Responses Received	Response Rate (within Category)
Building Materials	70	33	47%
Variety Stores	8	4	50%
Automobile Parts	69	25	36%
Convenience Stores	128	43	33%
			(overall response rate)
Totals	275	105	41.7%

The store information section collected information on the size of the store. This section also asked if the store used a POS system. It also asked the users familiarity with

their POS system, and asked the respondent to rate their POS system in six different areas.

The third section was inventory. This was used to gather information on the retailer's inventory frequency with their POS system, as well as before the POS. Another area of this section was to determine the amount of time each retailer spent on inventory control. Information was collected on the respondent's opinion regarding whether the company saved money using POS.

#### Results: Demographics

The majority of the respondents, 64 of 105 (61%), were managers. There were 5 assistant managers, 2 supervisors and 34 identified themselves as "Other" (Table 3). Some respondents in the "Other" category described themselves further, naming such positions as owners and owner-managers. Of those 34 "others," 20 respondents identified themselves as being owners even though the survey did not ask for that identification explicitly; these are listed separately in Table 3.

Table 3

## Respondents' positions in company

Position in Company	Number of respondents	Percentage of respondents
Manager	64	62%
Assistant Manager	5	5%
Supervisor	2	2%
Owner	20	20%
Other	12	11%
Total	105	100%

The average respondent had been with their company for 11.71 years. These tenures in jobs ranged from 3 months to 48 years. There were 59 of the 105 respondents who had been with the company for over 10 years.

Of the 105 respondents, 44 had a high school education, 18 had an Associate degree, 28 had a Bachelor degree, and 3 held a Masters degree. The "Other" category was selected by twelve respondents. These included people with, for example, an 8<sup>th</sup> grade education or "some college" (Table 4).

Table 4

Respondents' education level

Education Level	Number of Respondents	Percentage of respondents
Masters	3	3%
Bachelor	28	27%
Associate	18	17%
High School	44	42%
Other	12	11%
Total	105	100%

Respondents held degrees in 18 different fields.

Twenty respondents held a degree in "Business" (generally) the largest single category. Accounting, Education and Marketing each were mentioned by 3 respondents.

The other 20 degrees held were distributed among 14 other fields.

Results: Store Information

The survey data showed that there was an average of 16 employees per store. The number of employees ranged from none to as many as 270. Each retailer had an average of

just over two cash registers/checkout stations per store. A cross tabulation (and chi-square statistical analysis) was conducted to see if there is any difference between stores with different numbers of cash registers in terms of whether or not they used a POS system.

The number of cash registers question asked, "How many cash registers/checkout stations does your store have?" The gathered data were collapsed into three categories. Results show that there is a higher incidence of POS usage among stores with a higher number of cash registers. Small stores, on the other hand (i.e., those with fewer cash registers), more frequently indicated that they do not use a POS system. This difference is significant ( $\chi^2 = 25.013$ ;  $p = .000$ ). The more cash registers a company uses, the greater the chance it also uses a POS system (Table 5).



Table 5

Number of cash registers to POS use

Number of cash registers	Does Company use POS	Does Company use POS	Total
	Yes	No	
One or no registers	13	32	45
Two cash registers	19	13	32
Three or more cash registers	24	3	27
Total	56	48	104

(Pearson)  $\chi^2 = 25.013$ ;  $p = .000$ 

Of the 105 respondents, 56 (53.34%) used some kind of a POS system. As previously discussed, these data comprise four groups (Table 6). Of the 33 respondents in the Building Materials group, 15 (45.45%) used a POS system. There were only 4 respondents in the Variety group; none of these retailers used a POS system. In the third group, Auto Parts, 19 of the 25 respondents (76.00%) reported using a POS system. For the last group, Convenience Stores, 22 out of 43 respondents (51.16%) used a POS system.

Retailers reported 39 different types of software (Appendix E) and 22 different types of hardware (Appendix F) for their POS systems.

Table 6

List of respondents who use a POS system by groups

Respondents Group	Number of questionnaires sent	Number of Respondents by group	Respondents who use a POS	Percentage of survey respondents who use a POS
Building Materials	70	33	15	45%
Variety Stores	8	4	0	0%
Automobile Parts	69	25	19	76%
Convenience Stores	128	43	22	51%
Totals:	275	105	56	53%

The groups show (overall) good familiarity with their POS systems (recall that no respondents from the Variety Store category stated that they use a POS). From the

Building Materials category, 9 of the 15 respondents who used POS were very familiar with their POS, and 4 were somewhat familiar. Two claimed fair familiarity with their POS system.

In the Auto Parts group, 10 of the 19 respondents who used POS were very familiar with their POS systems. Six reported being somewhat familiar, and one reported fair familiarity. One respondent indicated that s/he was not very familiar with their store's POS.

In the Convenience Store group, 14 of the 22 respondents who used a POS reported being very familiar. Four reported being somewhat familiar, and one of the 22 respondents said they had a fair familiarity with their POS system. One respondent indicated that s/he was not very familiar with their store's POS.

A cross-tabulation and Chi-Square test was conducted on whether a respondent's familiarity with their POS system associates with a difference in their opinion as to whether POS saves their company money. Fifty respondents answered both questions, thus qualifying for analysis.

The familiarity data were collapsed into two categories, "Somewhat/less than Familiar" (n = 19), and "Very Familiar" (n = 31). Among the 19 less-familiar

respondents, 13 (68.4%) believed that their POS saves them money, and 6 did not. Twenty-five of the 31 familiar respondents (80.6%) believed that the POS saves their company money. This difference, however, is not statistically significant ( $\chi^2 = .965$ ;  $p = .258$ ). It may be, given that the ratios were to hold true, that a larger sample size would have identified this difference as being reliable and, thus, applicable to the larger population (Table 7).

Table 7

Familiarity with POS to does POS save company money

Familiarity with POS system	Does POS save Company Money?		Total
	Yes	No	
Somewhat/less than Familiar	13	6	19
Very Familiar	25	6	31
Total	38	12	50

(Pearson)  $\chi^2 = .965$ ;  $p = .258$

Of the retailers who use some kind of a POS system, a great majority (43 of 56; 77%) rated their POS systems as either easy or very easy to use. Forty of the 56 (71.42%) rated their systems as either very good or good in terms of "User/Product Support."

There were a wide variety of reasons upon which the selection of the respondents' POS systems had been based. Those reasons included Cost, Support, Employee Familiarity, and "Other". "Other" included reasons such as corporate decision, or that the system is unique to the product being sold. Several companies cited multiple reasons for selecting their POS system.

Overall, retailers gave their POS systems an average satisfaction rating of 7.17 on a scale of 1-10, with a range from a low of 2 to a high of 10. These numbers are encouraging, in that they signal that retailers are satisfied with their POS systems.

#### Results: Inventory

The majority of the respondents, 68 out of 105 (64.80%), conduct annual inventories. The other 37 respondents were divided between biannual and semiannual inventorying schedules.

As indicated earlier, 49 respondents reported not using a POS system. Of these, 45 also gave a reason for that decision. The most frequently reported reason for not using a POS (16 of 45; 35.56%) was that the "Business is Too Small." This rationale was followed in response frequency by "Not Needed" (12 of 45; 26.67%); then, "Cost" (10 of 45; 22.22%). There were 6 responses of "other" reasons, which included respondent-reported reasons such as, "Corporate decision," "Too time consuming to load," and "Cost of service contract". One respondent indicated that s/he did not use a POS system because it would be "Hard to Learn."

Of the 56 respondents who do use a POS, 50 answered the question, "Do you feel that your POS system has saved your company money on inventory control?" Thirty-nine of those 50 (78%) said that their POS system has saved their company money. Within the first group, Building Materials, 13 of the 15 user-respondents said that their POS saved them money. There was one respondent in this group who felt that their POS did not save them money, and one who did not answer the question (as before, recall that none of the respondents in the Variety Store group uses a POS).

In the Automobile Parts group, 14 of the 19 user-respondents said that their POS saved their company money. There were 3 respondents who reported that they didn't think the POS saved them money, and one respondent who wasn't sure. There was also one non-response to the question in this group.

In the Convenience Stores group, 12 of the 22 user-respondents reported that their POS saved them money. There were 7 respondents that reported they didn't save money from their POS. There was one "Not Sure" response, and two non-responses.

A cross tabulation and chi-square test was conducted to determine whether respondents' satisfaction rating affected their opinion on whether POS saved the company money. Results of the analysis show that there are no significant differences in money-saving perceptions among respondents who differ in their satisfaction levels ( $\chi^2 = 1.293$ ;  $p = .731$ ; Table 3).

Table 8

Satisfaction and money savings

Satisfactory Rating (collapsed)	Does POS save company money?		Total
	Yes	No	
Rating of Between 1-6	9	3	12
Rating of 7	10	3	13
Rating of 8	11	5	16
Rating of 9-10	8	1	9
Total	38	12	50

(Pearson)  $\chi^2 = 1.293$ ;  $p = .731$

One area that did not change in the direction expected was the frequency of doing inventories. The expectation was that POS system use would be associated with a reduced frequency of inventorying. In fact, some users of POS report conducting inventories more frequently than before.

A cross tabulation was conducted for users before and after implementing a POS system. The analysis shows that prior to POS, there were 29 of 34 users who did inventory annually; after POS, only 25 still did so. Prior to POS, only 5 users conducted their inventory checks semi-



annually; now 9 users do so semi-annually. The decrease in annual inventorying, and the increase in semi-annual, represents a statistically significant change ( $\chi^2 = 16.284$ ;  $p = .000$ ). The use of POS systems seems to be associated with more frequent - not less frequent - inventorying (Table 9).

Table 9

POS use and inventory frequency

Inventory Frequency Prior to POS Use	Does POS save company money?		Total
	Yes	No	
Annual	25	4	29
Semiannual	0	5	5
Total	25	9	34

(Pearson)  $\chi^2 = 16.284$ ;  $p = .000$

Two cells have an expected count of less than 5. The minimum expected count is 1.3.

(Note: The two survey questions used to generate these data included other categories, however, the other categories differed between the two questions. For this reason, only the annual and semi-annual categories (shared between the two questions) are presented here.)

In terms of time spent on inventory control, the average for all groups was 7.18 hours per week (one of the retailers had multiple departments; when these were combined, s/he reported spending a total of 230 hours a week on inventory management. This retailer was considered to be an outlier, and excluded from the analysis). Retailers who used a POS averaged 7.22 hours a week, while retailers without a POS averaged 7.14 hours a week. A t-test showed that this small difference is not statistically significant ( $p = .969$ ; Table 10).

Table 10

T-test for time spent on inventory

Does Company use a POS	N	Mean	Std Deviation	Std Error Mean
YES	48	7.2188	8.2487	1.1906
NO	38	7.1382	11.2013	1.8171
	t	df	Sig. (two-tailed)	Mean Difference
	.038	84	.969	8.060E-02

The average amount of money spent on inventories (annually) was \$1127.86 per inventory. Only 46 out of the 105 responders to the survey answered the question. Furthermore, there were two outliers with cost estimates > \$10,000. These were excluded from the analysis. Retailers who used a POS averaged cost of \$1391.05 per year, while retailers without a POS averaged \$908.54 per year. A t-test showed that this difference, though substantial, is not statistically significant ( $p = .364$ ). It is good to recall, however, that semi-annual inventoring is more common among POS system users, hence, some portion of the higher annual cost average (above) may be biased upwards.

Table 11

T-test for dollars spent on inventory (annually)

Does Company use a POS	N	Mean	Std Deviation	Std Error Mean
YES	20	1391.0500	1663.0425	371.8676
NO	24	908.5417	1796.2797	356.6640
	t	df	Sig. (two-tailed)	Mean Difference
	.917	42	.364	482.5083

## Summary

The rate of return with the questionnaires was 107 out of 275 (38.90%) sent out. Of these returns 56 of the 105 (53.33%) useable returns reported using some kind of a POS system. The overall breakdown of POS users by groups was 15 out of the 33 (45.45%) respondents in the building material group used a POS, while none of the retailers in the variety stores group used a POS system. The auto parts group reported that 19 of the 25 (76.00%) respondents used a POS system. The convenience store group reported 22 of the 43 (51.16%) respondents used a POS.

Retailers also gave high marks to their POS systems in areas such as user friendliness and user support. There were 40 of 56 (71.42%) respondents who said their POS was very good or good in product support. The study showed that 43 of the 56 (76.78%) of the respondents felt that their POS systems were either very easy or easy to use. Overall 33 of 56 respondents felt they were very familiar with their POS systems. Retailers who used POS gave using a POS system a favorable rating of 7.17 on a scale of 1-10 where one is low and 10 being the high satisfaction. A majority 39 of the 50 (78%) of the respondents who use a POS and

responded to the question, felt that their POS system saved their company money.

There was a wide variety of reasons for basing the decision on selecting the current POS system. The choices included cost, support, employee familiarity and "other".

The study concluded that a majority 67 of the 105 (63.80%) of the respondents conducted annual inventories. The other 38 all were divided between biannually, semiannually, monthly, quarterly and daily.

There were 49 respondents who reported not using a POS system. The most frequently reported reason for not using a POS system was that the business was too small 22 of the 49 (44.89%).

There was no significant difference noted in most test areas. One area that showed significant results was a company use a POS and the number of cash registers the company has. This difference is significant ( $\chi^2 = 25.013$ ;  $p = .000$ ). The more cash registers a company uses, the greater the chance it also uses a POS system. This area showed that of the respondents who used a POS rose as the number of cash registers increased. Likewise Non-POS users fell as the number of cash registers increased.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Summary

This study was conducted in order to answer the questions of whether or not using a POS system saved companies money, and if the use of POS had a significant impact on the number of physical inventories a company conducted.

This study showed that there was an impact on both of these areas. Results showed 39 of 50 (78%) respondents who use a POS felt that their POS system saved their company money; 14.55% also showed that the frequency of doing their inventories was less than before they started using a POS. There was also an increase in the frequency of inventories conducted by some companies.

The average amount spent on inventories was \$1678.36 per inventory. This amount will not be accurate due to the fact that only 46 out of 105 respondents answered the question on how much they spend on inventories.

The majority of the respondents, 36 out of 54

(66.66%), said that they were very familiar with their POS systems, while 43 respondents rated their POS systems as either easy or very easy to use. This is a very good indication that the POS systems of today are easy to use.

When asked to rate their POS systems on a scale of 1-10, 1 being the worst and 10 being the best, and retailers gave their POS systems an overall rating of 7.17 on a scale of 1-10. These numbers ranged from a low of 2 to a high of 10. These numbers are also encouraging as they show that retailers perceive their POS systems to be reliable and helpful.

The survey found that POS can and does have a positive impact on a retailer's business in both customer service and inventory management.

The statistical analysis showed some nonconclusive and conclusive results. The analysis shows that prior to POS, there were 29 of 34 users who did inventory annually; after POS, only 25 still did so. Prior to POS, only 5 users conducted their inventory checks semi-annually; now 9 users do so semi-annually. The decrease in annual inventorying, and the increase in semi-annual, represents a statistically significant change ( $\chi^2 = 16.284$ ;  $p = .000$ ). The use of POS systems seems to be associated with more frequent - not

less frequent - inventorying. The one area that did show some conclusive results was in the area of does a company use a POS and the number of cash registers the company has. Results show that there is a higher incidence of POS usage among stores with a higher number of cash registers. Small stores, on the other hand (i.e., those with fewer cash registers), more frequently indicated that they do not use a POS system. This difference is significant ( $\chi^2 = 25.013$ ;  $p = .000$ ). The more cash registers a company uses, the greater the chance it also uses a POS system. This test also showed that the respondents who reported not using a POS system fell as the number of cash registers increased.

#### Conclusions

This study showed that using a POS system in a business can have a positive impact on the business. Companies of today have a tool in POS to help them in a wide variety of functions. These functions include better inventory control, better consumer information collection, and an inexpensive way to advertise by printing coupons on receipts. These functions as well as the fact that today's POS systems can be very inexpensive to purchase and maintain, offer retailers one way to cut overhead costs and boost their customer base and profits.



Even though the benefits of POS are well documented only 53.33% of the respondents of the survey said they use a POS system. This could be seen as a lack of knowledge of POS systems and the many benefits it offers. This contention is supported by the fact that the majority 39 out of the 56 (69.64%) respondents felt that their POS saved them money.

The study provided some interesting results by showing that inventories actually increased in some businesses. The analysis shows that prior to POS, there were 29 of 34 users who did inventory annually; after POS, only 25 still did so. Prior to POS, only 5 users conducted their inventory checks semi-annually; now 9 users do so semi-annually. The use of POS systems seems to be associated with more frequent - not less frequent - inventorying.

This study showed there was more time and money spent on inventories by companies who used POS than those who didn't. This was an unexpected result, as the opposite would be expected.

There wasn't enough information available to determine statistically whether or not POS had the anticipated results on saving a company time and money on inventories. More study is needed in this area.

### Recommendations for Further Study

It is recommended that a survey be conducted to get feedback from a more diverse field of retailers. This survey needs to expand on points of interest of this study. These points include areas such as the amount of time it takes to conduct a survey prior to and after getting a POS system.

Another area of study could be conducted regarding satisfaction a business has with their POS system. A study could be conducted on how much money POS saves a retailer.

Another area that needs is a study that examines quantity and variety of products the retailer sells, because based on this study's results retailers felt that their business was too small for POS. Such a study could provide valuable information to small retailers on using POS and its potential benefits.

### Recommendations Based on Findings

Based on this study there needs to be more education on POS provided to North Dakota retailers to show the benefits and cost analysis of the different types of POS available. The state's Small Business Administration should develop a program that could provide information on POS to all retailers. It is also recommended that this program

should include the following areas of interest at a minimum:

- Overview of the POS components.
- Overview of the functions of POS.
- Review of different vendors and some of their prices.
- Provide information showing POS benefits.
- Provide information on professional sources that retailers can go for expert advice on POS systems.

These steps would go a long way in helping small business in North Dakota stay competitive and lower overhead costs.

Appendix A

Survey Instrument

## Point of Sale Survey

### **Part I - Demographics**

1. What is your current position with the company? Manager, Asst Manager, Supervisor,  
Other \_\_\_\_\_
2. How long have you been in your current position?
3. What is your education Level? Masters, Bachelors, Associate, High School, Other?  
\_\_\_\_\_
4. If you have a degree what field is it in? \_\_\_\_\_

### **Part II - Store Information**

1. How many employees work at your store? \_\_\_\_\_
2. How many cash registers I checkout stations does your store have? \_\_\_\_\_
3. Does your store use a Point of Sale System? Y N (If your store does not use a Point of Sale system (POS) please go to Section III question # 1)
4. How familiar are you with your POS, and how it works?  
\_\_\_\_\_ Very familiar  
\_\_\_\_\_ Somewhat familiar  
\_\_\_\_\_ Fair  
\_\_\_\_\_ Not Very familiar  
\_\_\_\_\_ Not familiar at all
5. What brand of software do you use for your POS?  
\_\_\_\_\_

6. What brand of hardware do you use for your POS?

\_\_\_\_\_

7. How would you classify your POS system's user friendliness?

\_\_\_\_\_ Very Easy

\_\_\_\_\_ Somewhat Easy

\_\_\_\_\_ Fair

\_\_\_\_\_ Somewhat Difficult

\_\_\_\_\_ Very Difficult

8. Does your company contract out the maintenance of the POS System, Y N ? If so  
what company maintains your POS System? \_\_\_\_\_

9. How would you rate your system for product / user support?

\_\_\_\_\_ Very good

\_\_\_\_\_ Good

\_\_\_\_\_ Fair

\_\_\_\_\_ Poor

\_\_\_\_\_ Very poor

10. Does your company have its own Information System Department? Y N

11. If you have an Information System Department how many people are employed in  
this department ? \_\_\_\_\_

12. How would you rate your overall satisfaction with your POS System

1 = Low 10 = High? 1 2 3 4 5 6 7 8 9 10

13. What did you base your decision for selecting your current POS system,

- Cost
- Support
- Employee familiar W/ product
- Other \_\_\_\_\_?

**Part III - Inventory**

1. How often do you do a Physical Inventory of your store

- Biannually
- Annually
- Semiannually

2. How often did you do your physical Inventories prior to getting your POS?

- Annually
- Semiannually
- Quarterly
- Other \_\_\_\_\_

3. If your store does not use a POS system, what is the reason for not using one?

- Cost
- Hard to learn
- Not needed
- Business is too small
- Other \_\_\_\_\_

4. How many hours a week do you dedicate to inventory control? \_\_\_\_\_
5. If your company uses a POS system how many hours a week do you dedicate to maintaining your POS system? \_\_\_\_\_
6. Do you feel that your POS system has saved your company money on inventory control?
- \_\_\_\_\_ Yes
- \_\_\_\_\_ No
7. How much does your store spend on conducting physical inventories?
- \_\_\_\_\_

**Follow Up Question**

Would you be interested in getting the results of this study?

- \_\_\_\_\_ Yes
- \_\_\_\_\_ No

If you would like these results please provide the address you want the results sent to.



APPENDIX B  
Cover Letter

DEPARTMENT OF INDUSTRIAL TECHNOLOGY  
P.O. BOX 7118  
GRAND FORKS, NORTH DAKOTA 58202-7118

(701) 777-2249  
FAX (701) 777-4320

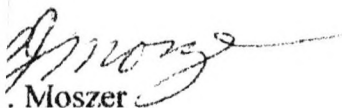
Sir / Madam

My name is Al J. Moszer and I am a Graduate Student at the University of North Dakota. I am doing my thesis on Point of Sale technology. I have prepared the enclosed survey as part of my research. I would appreciate it if you would please take the time to complete this survey and return it in the postage paid return envelope.

The survey is broken down into three parts. The first part of the survey is just for graphics. The second part is data on your store and Point of Sale Systems. The third part deals with inventory control management. I am collecting this Data to determine if Point of Sale technology offers a company cost saving benefits.

Please be assured that all the information you provide will be confidential no personal information or store names will be published. All collected data will be used for statistical data only. Thank you for your cooperation and assistance. If you have any questions please feel free to contact me at (701) 772-3763 or email me at [amosz@yahoo.com](mailto:amosz@yahoo.com)

Sincerely,

  
Al J. Moszer

APPENDIX C  
Follow-Up Letter

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DEPARTMENT OF INDUSTRIAL TECHNOLOGY  
P.O. BOX 7118  
GRAND FORKS, NORTH DAKOTA 58202-7118  
(701) 777-2249  
FAX (701)777-4320

Dear Sir/ Madam

Approximately two weeks ago I mailed your store a survey that I was doing for my research to obtain my masters degree. The survey was about Point of Sale Systems. It is very important for me to get as many of these surveys back so that I can come up with as accurate data as possible.

If you have not yet returned this survey to me I would very much appreciate it if you could please take the time to respond to my survey. Once again thank you for your time and consideration. For your convenience I have enclosed another copy of the survey. If you have any questions please feel free to contact me at (701)772-3763 or by email at [themosz@yahoo.com](mailto:themosz@yahoo.com).

Sincerely,



AL J. Moszer  
Graduate Student  
University of North Dakota

APPENDIX D

Respondent's Years With the Company

## Respondent's Years With the Company

The number of years with the company varied from 3 months to forty-eight years. The number of years with the company is listed below in no particular order. The average number of years with the company was 11.78 years.

20	2	.45	20
3	30	10	21
3	1	5	25
4	2	30	3
.75	20	15	19
17	5	15	20
20	4.5	10	15
2.5	.5	10	.25
3	20	15	2
21	1	.33	11
2	20	28	48
29	14	3	16
16	7	8	19
9	12	20	10
3	7	15	19
2	14	1	16
19	15	20	2
7	2.5	1.5	19
4	9	9	5
05	5	25	30
4	25	15	11
5.5	8	15	10
2	5	25	5
18	4	15	15
17	19	22	
25	.45	20	

Appendix E

Reported POS Software Used By Retailers

## Reported POS Software Used By Retailers

Access (Homemade)  
AccuTerm 97  
Advantage IBM  
Auto gas  
Casio S-4 (2)  
CCI - Triad's own(3)  
CCINER  
CFN  
CFN III  
Compu-Power Inc  
Computer Guidance  
Data General  
DIS (2)  
Falcon  
Gas Boy  
Gas Boy Profit Point  
Goodyear  
Great Plains Act W/AMS POS  
IBS  
Info Touch  
Lumber Base  
Micro Soft (3)  
Mobile Toys  
NCR  
NCR Till Driven  
PBX  
Profit Pro  
QDS  
Quick Books 2003  
QuickSell- Microsoft  
Red River / Gas Boy (2)  
Ruby Veriphone (3)  
Scan Master  
Tams (2)  
Tire Master  
Tracs  
Unicom  
Versapro by Control Technology  
Windows 98



APPENDIX F

Reported POS Hardware Used By Retailers

Reported POS Hardware Used By Retailers

asio  
icrosoft  
CR 2127  
C  
uby Veriphone  
ooperative Computing  
Compaq  
CCI - Triad  
IBM  
Window  
Goodyear  
IBM  
Gas Boy CFN 3  
Polaris  
Tire Management Systems  
DTK  
Del  
Tams  
Viewpoint Technologies  
Gas Boy PD  
Nobilis  
IBM

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